



# INSTALLATION MANUAL

## Unit for air to water heat pump system

EDLQ036BA6VJU1  
EDLQ048BA6VJU1  
EDLQ054BA6VJU1

EBLQ036BA6VJU1  
EBLQ048BA6VJU1  
EBLQ054BA6VJU1

Installation manual  
Unit for air to water heat pump system

Manuel d'installation  
Unité pour système de pompe à chaleur air à eau

Manual de instalación  
Unidad para bomba de calor de aire-agua

**English**

**Français**

**Español**

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## CONTENTS

	Page
Introduction.....	1
General information .....	1
Scope of this manual .....	2
Model identification .....	2
Accessories .....	2
Accessories supplied with the unit .....	2
Safety considerations .....	3
Before installation .....	4
Important information regarding the refrigerant used .....	4
Selecting installation site .....	4
Selecting a location in cold climates .....	5
Precautions on installation.....	5
Installation method for prevention of falling over .....	5
Installation servicing space .....	6
Typical application examples .....	7
Application 1 .....	7
Application 2 .....	7
Application 3 .....	8
Application 4 .....	8
Application 5 .....	9
Application 6 .....	11
Overview of the unit.....	11
Opening the unit.....	11
Main components.....	12
Water pipework .....	13
Charging water.....	16
Piping insulation.....	16
Field wiring.....	17
Installation of the digital controller.....	22
Start-up and configuration .....	23
DIP switch settings overview.....	23
Room thermostat installation configuration.....	23
Pump operation configuration .....	23
Domestic hot water tank installation configuration .....	24
Initial start-up at low outdoor ambient temperatures.....	24
Pre-operation checks .....	24
Powering up the unit .....	25
Setting the pump speed .....	25
Field settings.....	25
Field settings table .....	35
Test run and final check.....	37
Automatic test run .....	37
Test run operation (manual) .....	37
Maintenance and service .....	37
Maintenance and service .....	37
Troubleshooting .....	38
General guidelines .....	38
General symptoms.....	38
Error codes .....	39
Technical specifications .....	40
General .....	40
Electrical specifications.....	40



READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION. KEEP THIS MANUAL IN A HANDY PLACE FOR FUTURE REFERENCE.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

ALL ACTIVITIES DESCRIBED IN THIS MANUAL SHALL BE CARRIED OUT BY A LICENSED TECHNICIAN.

BE SURE TO WEAR ADEQUATE PERSONEL PROTECTION EQUIPMENT (PROTECTION GLOVES, SAFETY GLASSES, ...) WHEN PERFORMING INSTALLATION, MAINTENANCE OR SERVICE TO THE UNIT.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

THE UNIT DESCRIBED IN THIS MANUAL IS DESIGNED FOR OUTDOOR INSTALLATION.

The English text is the original instruction. Other languages are translations of the original instructions.

## INTRODUCTION

### General information

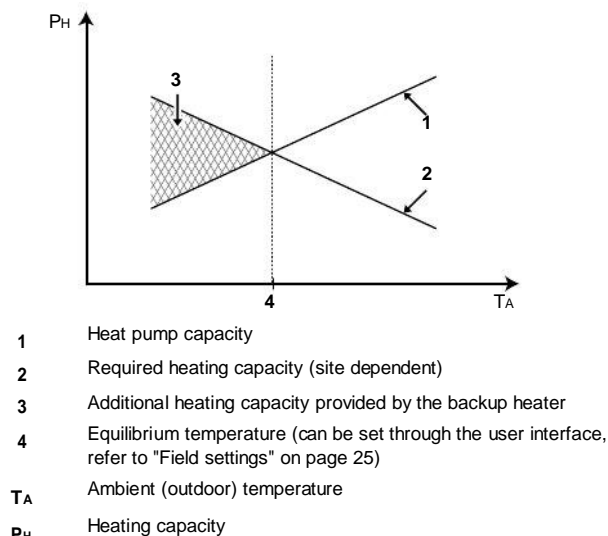
These units are used for both heating and cooling applications. The units can be combined with Daikin fan coil units, floor heating applications, low temperature radiators, domestic hot water tank (option) and solar kit (option).

A remote controller is standard supplied with the unit to control your installation.

### Heating/cooling units and heating only units

The monoblock unit range consists of two main versions: a heating/cooling (EB) version and a heating only (ED) version.

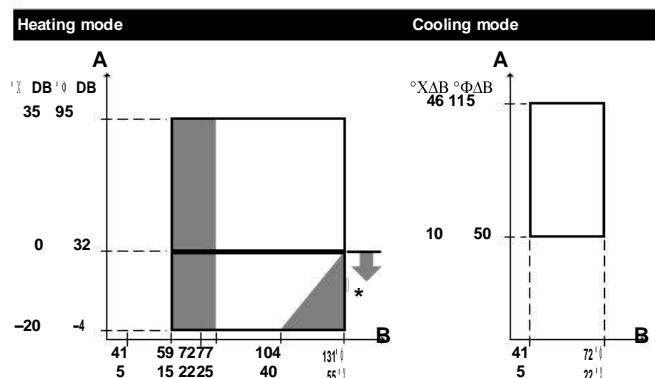
Both versions are delivered with an integrated backup heater for additional heating capacity during cold outdoor temperatures. The backup heater also serves as a backup in case of malfunctioning of the unit and for freeze protection of the outside water piping during winter time. The backup heater factory set capacity is 6 kW, however, depending on the installation, the installer can limit the backup heater capacity to 3 kW. The backup heater capacity decision is a mode based on the equilibrium temperature, see scheme below.



- **Domestic hot water tank EKHW\*** (option)  
An optional EKHW\* domestic hot water tank with integrated 3 kW electrical booster heater can be connected to the unit. The domestic hot water tank is available in two sizes: 50 and 80 gallons (200 and 300 litre).
- **Room thermostat** (option)  
An optional room thermostat EKRTWA can be connected to the unit.
- **Solar kit for domestic hot water tank** (option)  
An optional solar kit EKSOLHW can be connected to the unit. Contact your dealer for more allowed solar kits.
- **Remote alarm kit** (option)
- **Digital I/O PCB kit** (option)  
An optional EKR1HB digital I/O PCB can be connected to the indoor unit and allows:
  - remote alarm output
  - heating/cooling ON/OFF output
  - bivalent operation (permission signal for the auxiliary boiler)
 Refer to the operation manual of the indoor unit and to the installation manual of the digital I/O PCB for more information. Refer to the wiring diagram or connection diagram for connecting this PCB to the unit.

To obtain more information concerning these option kits, please refer to dedicated installation manuals of the kits.

## Operation range



(\*) The models have a freeze prevention function using the pump and back up heater to keep the water system safe from freezing in all conditions. In case accidental or intentional power shutdown is likely to happen we recommend to use glycol. (Refer to Caution: "Use of glycol" on page 16)

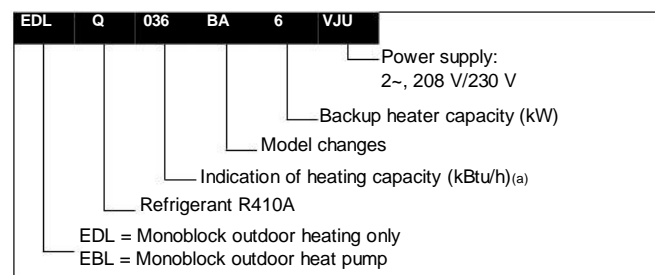
## Connection to a benefit kWh rate power supply

This equipment allows for connection to benefit kWh rate power supply delivery systems. Full control of the unit will remain possible only in case the benefit kWh rate power supply is of the type that power supply is not interrupted. Refer to "Connection to a benefit kWh rate power supply" on page 21 for more details.

## Scope of this manual

This installation manual describes the procedures for installing and connecting all EDL and EBL outdoor unit models.

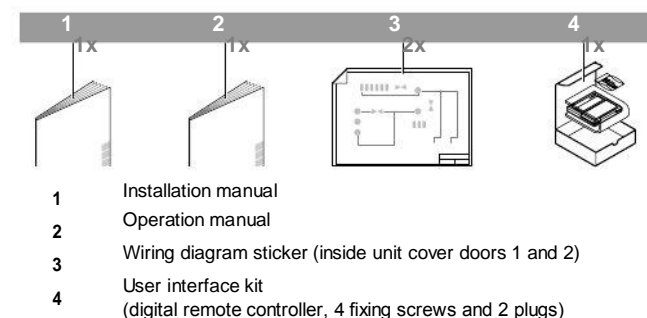
## Model identification



(a) For exact values, refer to "Technical specifications" on page 40.

## ACCESSORIES

### Accessories supplied with the unit



## SAFETY CONSIDERATIONS

The precautions listed here are divided into the following two types. Both cover very important topics, so be sure to follow them carefully.

Meanings of **DANGER**, **WARNING**, **CAUTION** and **NOTE** symbols.



### DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

### NOTE

Indicates situations that may result in equipment or property-damage accidents only.

### Danger

- Before touching electric terminal parts, turn off power switch.
- When service panels are removed, live parts can be easily touched by accident.  
Never leave the unit unattended during installation or servicing when the service panel is removed.
- Do not touch water pipes during and immediately after operation as the pipes may be hot. Your hand may suffer burns. To avoid injury, give the piping time to return to normal temperature or be sure to wear proper gloves.
- Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.
- Before touching electrical parts, turn off all applicable power supply.

### Warning

- Tear apart and throw away plastic packaging bags so that children will not play with them.  
Children playing with plastic bags face danger of death by suffocation.
- Safely dispose of packing materials. Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Ask your dealer or qualified personnel to carry out installation work. Do not install the machine by yourself.  
Improper installation may result in water leakage, electric shocks or fire.
- Perform installation work in accordance with this installation manual.  
Improper installation may lead to water leakage, electric shocks or fire.
- Be sure to use only the specified accessories and parts for installation work.  
Failure to use the specified parts may result in water leakage, electric shocks, fire, or the unit falling.
- Install the unit on a foundation that can withstand its weight.
- Insufficient strength may result in the fall of equipment and causing injury.
- Carry out the specified installation work in consideration of strong winds, hurricanes, or earthquakes.  
Improper installation work may result in accidents due to fall of equipment.

- Make certain that all electrical work is carried out by qualified personnel according to the local laws and regulations and this installation manual, using a separate circuit.  
Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Be sure to install a ground fault circuit interrupter according to local laws and regulations.  
Failure to install a ground fault circuit interrupter may cause electric shocks and fire.
- Make sure that all wiring is secure, using the specified wires and ensuring that external forces do not act on the terminal connections or wires.  
Incomplete connection or fixing may cause a fire.
- When wiring the power supply, form the wires so that the frontside panel can be securely fastened.  
If the frontside panel is not in place, overheat of the terminals, electric shocks or a fire may be caused.
- After completing the installation work, check to make sure that there is no leakage of refrigerant gas.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.
- Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation.  
Your hands may suffer burns if you touch the internal parts. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear proper gloves.

### Caution

- For use of units in applications with temperature alarm settings it is advised to foresee a delay of 10 minutes for signalling the alarm in case the alarm temperature is exceeded. The unit may stop for several minutes during normal operation for "defrosting of the unit" or when in "thermostat-stop" operation.
- Ground the unit.  
Grounding resistance should be according to local laws and regulations  
Do not connect the ground wire to gas or water pipes, lightning conductor or telephone ground wire.  
Incomplete grounding may cause electric shocks.
- Gas pipe.  
Ignition or explosion may occur if the gas leaks.
- Water pipe.  
Hard vinyl tubes are not effective grounds.
- Lightning conductor or telephone ground wire.  
Electric potential may rise abnormally if struck by a lightning bolt.
- Install the power wire at least 3 feet (1 meter) away from televisions or radios to prevent image interference or noise. (Depending on the radio waves, a distance of 3 feet (1 meter) may not be sufficient to eliminate the noise.)
- Do not rinse the unit. This may cause electric shocks or fire.
- Do not install the unit in places such as the following:
  - Where there is mist of mineral oil, oil spray or vapour.  
Plastic parts may deteriorate, and cause them to fall out or water to leak.
  - Where corrosive gas, such as sulphurous acid gas, is produced.  
Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.



- Where there is machinery which emits electromagnetic waves.  
Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
- Where flammable gases may leak, where carbon fibre or ignitable dust is suspended in the air or where volatile flammables, such as thinner or gasoline, are handled.  
Such gases may cause a fire.
- Where the air contains high levels of salt such as that near the ocean.
- Where voltage fluctuates a lot, such as that in factories.
- In vehicles or vessels.
- Where acidic or alkaline vapour is present.

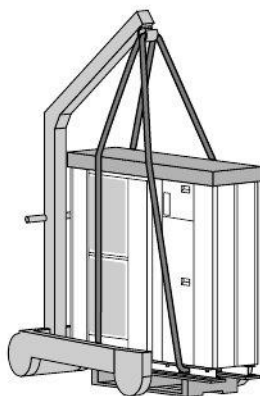
## BEFORE INSTALLATION

### Installation

- Be sure to confirm the model name and the serial no. of the outer (front) plates when attaching/detaching the plates to avoid mistakes.
- When closing the service panels, take care that the tightening torque does not exceed 3.03 lbs·ft (4.1 N·m).

### Handling

Due to relatively large dimensions and high weight, the handling of the unit is only to be done by means of lifting tools with slings. These slings can be fitted into specially for this purpose foreseen sleeves at the base frame.



- To avoid injury, do not touch the air inlet or aluminium fins of the unit.
- Do not use the grips in the fan grills to avoid damage.
- Unit is top heavy!  
Prevent the unit from falling due to inclination during handling.  
Centre of gravity is indicated on the unit.

## IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type: R410A

GWP<sup>(1)</sup> value: 1975

<sup>(1)</sup> GWP = global warming potential

The refrigerant quantity is indicated on the unit name plate

## SELECTING INSTALLATION SITE

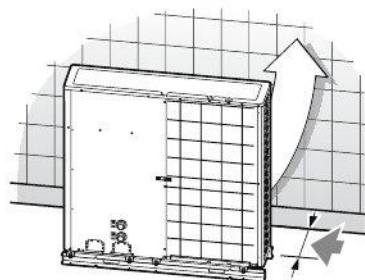


- Make sure to provide for adequate measures in order to prevent that the outdoor unit be used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

- 1 Select an installation site where the following conditions are satisfied and that meets with your customer's approval.
  - Places which are well-ventilated.
  - Places where the unit does not bother next-door neighbours.
  - Safe places which can withstand the unit's weight and vibration and where the unit can be installed level.
  - Places where there is no possibility of flammable gas or product leak.
  - The equipment is not intended for use in a potentially explosive atmosphere.
  - Places where servicing space can be well ensured.
  - Places where the units' piping and wiring lengths come within the allowable ranges.
  - Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
  - Places where the rain can be avoided as much as possible.
  - Do not install the unit in places often used as workplace.  
In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.
  - Do not place any objects or equipment on top of the unit (top plate)
  - Do not climb, sit or stand on top of the unit.
  - Be sure that sufficient precautions are taken, in accordance with relevant local laws and regulations, in case of refrigerant leakage.
- 2 When installing the unit in a place exposed to strong wind, pay special attention to the following.  
Strong winds of 16 ft/sec (5 m/sec) or more blowing against the unit's air outlet causes short circuit (suction of discharge air), and this may have the following consequences:
  - Deterioration of the operational capacity.
  - Frequent frost acceleration in heating operation.
  - Disruption of operation due to rise of high pressure.
  - When a strong wind blows continuously on the face of the unit, the fan can start rotating very fast until it breaks.

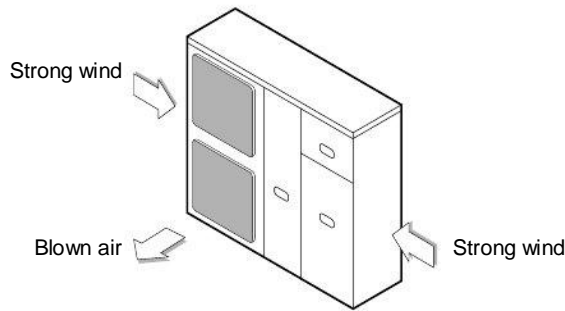
Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.

  - Turn the air outlet side toward the building's wall, fence or screen.

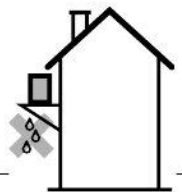


Make sure there is enough room to do the installation

- Set the outlet side at a right angle to the direction of the wind.



- 3 Prepare a water drainage channel around the foundation, to drain waste water from around the unit.
- 4 If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be maximum 6 inch (150 mm)).
- 5 If you install the unit on a frame, please install a waterproof plate within 6 inch (150 mm) of the underside of the unit in order to prevent the invasion of water from the lower direction.
- 6 When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.
- 7 If you install the unit on a building frame, please install a waterproof plate (field supply) (within 6 inch (150 mm) of the underside of the unit) in order to avoid the drainwater dripping. (See figure).



### Selecting a location in cold climates

Refer to "Handling" on page 4.



**NOTE** When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

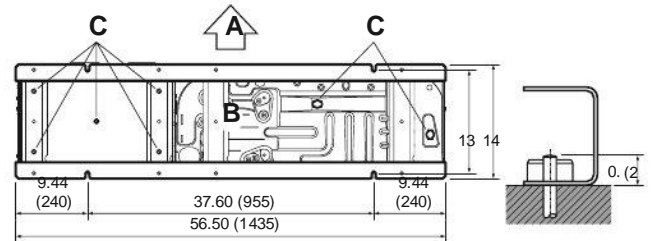
- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).



- 1 Construct a large canopy.
- 2 Construct a pedestal.  
Install the unit high enough off the ground to prevent burying in snow.

## PRECAUTIONS ON INSTALLATION

- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts. (Prepare four sets of 1/2 inch (M12) foundation bolts, nuts and washers each which are available on the market.)
- It is best to screw in the foundation bolts until their length are 0.8 inch (20 mm) from the foundation surface.

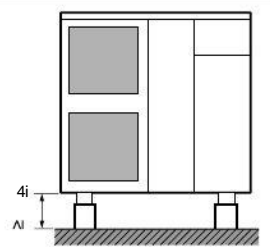


- A Discharge side
- B Bottom view inch (mm)
- C Drain hole

### NOTE



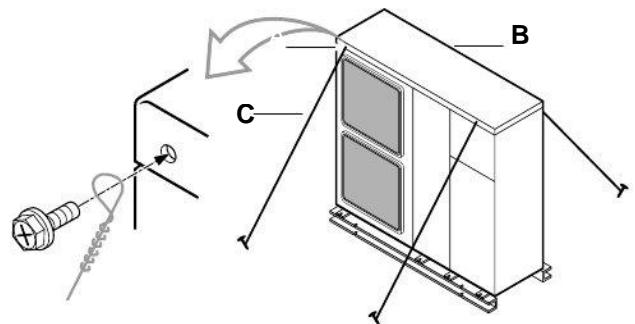
If drain holes of the unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 4 inch (100 mm) under the unit.



### Installation method for prevention of falling over

If it is necessary to prevent the unit from falling over, install as shown in the figure.

- prepare all 4 wires as indicated in the drawing
- unscrew the top plate at the 4 locations indicated A and B
- put the screws through the nooses and screw them back tight



- A Location of the 2 fixation holes on the front side of the unit
- B Location of the 2 fixation holes on the rear side of the unit
- C Wires: field supply







## Installation servicing space

The numerical figures used in the figures represent the dimensions in mm.

(Refer to "Precautions on installation" on page 5)

### Precaution

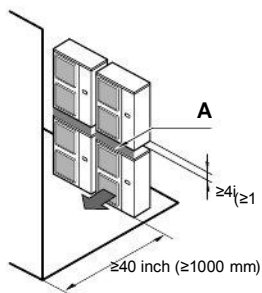
(A) In case of non-stacked installation figure 1A and figure 1B

	Suction side obstacle	✓	Obstacle is present
	Discharge side obstacle	1	In these cases, close the bottom of the installation frame to prevent the discharged air from being bypassed
	Left side obstacle		
	Right side obstacle	2	In these cases, only 2 units can be installed.
	Top side obstacle		This situation is not allowed

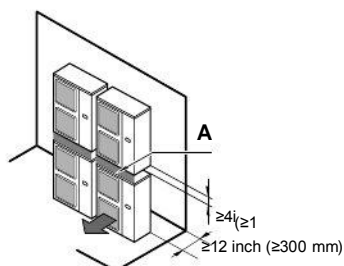
**NOTE** Minimum distance B1 in figure 1A and figure 1B mentions the space required for correct operation of the unit. Required space for servicing though is 12 inch (300 mm).

(B) In case of stacked installation

1. In case obstacles exist in front of the outlet side.



2. In case obstacles exist in front of the air inlet.

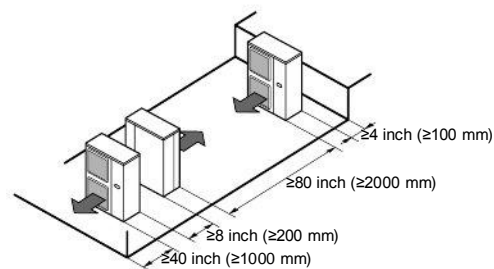


Do not stack more than one unit.

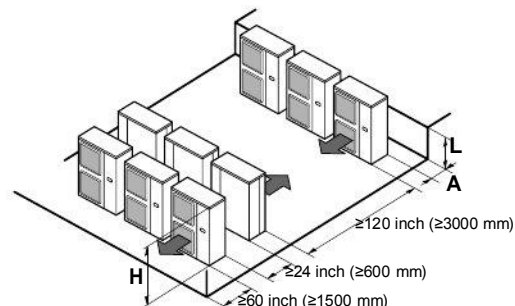
About 4 inch (100 mm) is required as the dimension for laying the upper unit's drain pipe. Get the portion A sealed so that air from the outlet does not bypass.

(C) In case of multiple-row installation (for roof top use, etc.)

1. In case of installing one unit per row.



2. In case of installing multiple units (2 units or more) in lateral connection per row.



Relation of dimensions of H, A and L are shown in the table below.

	L	A
L ≤ H	0 < L ≤ 1/2H	10 (250)
	1/2H < L	12 (300)
H < L	Installation not allowed	

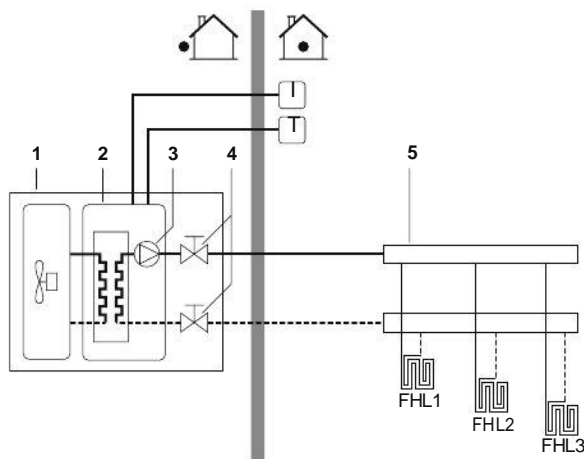


## TYPICAL APPLICATION EXAMPLES

The application examples given below are for illustration purposes only.

### Application 1

Space heating only application with a room thermostat connected to the unit.



- |   |                          |         |                                   |
|---|--------------------------|---------|-----------------------------------|
| 1 | Unit                     | FHL1..3 | Floor heating loop (field supply) |
| 2 | Heat exchanger           | T       | Room thermostat (optional)        |
| 3 | Pump                     | I       | User interface                    |
| 4 | Shut-off valve           |         |                                   |
| 5 | Collector (field supply) |         |                                   |

#### Unit operation and space heating

When a room thermostat (T) is connected to the unit and when there is a heating request from the room thermostat, the unit will start operating to achieve the target leaving water temperature as set on the user interface.

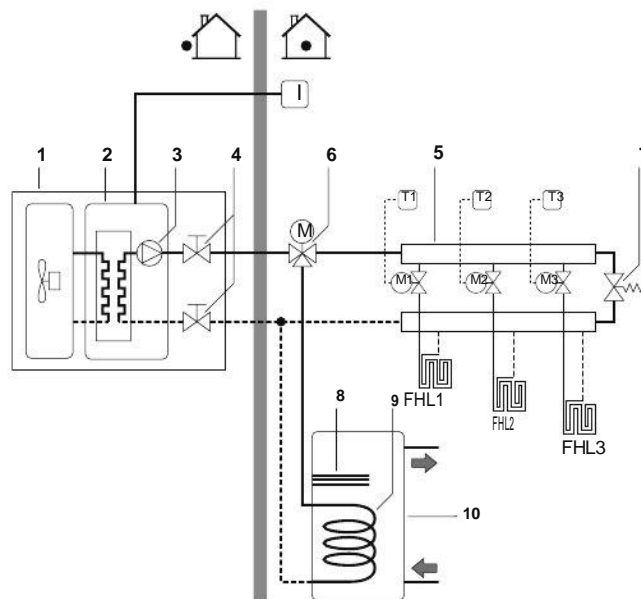
When the room temperature is above the thermostat set point, the unit will stop operating.



Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 20) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 23).

### Application 2

Space heating only application without room thermostat connected to the unit. The temperature in each room is controlled by a valve on each water circuit. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.



- |   |                                  |         |  |
|---|----------------------------------|---------|--|
| 1 | Unit                             | 9       | Heat exchanger coil  |
| 2 | Heat exchanger                   | 10      | Domestic hot water tank (optional)                             |
| 3 | Pump                             | FHL1..3 | Floor heating loop (field supply)                              |
| 4 | Shut-off valve                   | T1..3   | Individual room thermostat (field supply)                      |
| 5 | Collector (field supply)         | M1..3   | Individual motorised valve to control loop FHL1 (field supply) |
| 6 | Motorised 3-way valve (optional) | I       | User interface   |
| 7 | By-pass valve (field supply)     |         |  |
| 8 | Booster heater                   |         |  |

#### Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.

#### NOTE



Details on pump configuration can be found under "Pump operation configuration" on page 23.

#### Space heating

The unit (1) will operate to achieve the target leaving water temperature as set on the user interface.



When circulation in each space heating loop (FHL1..3) is controlled by remotely controlled valves (M1..3), it is important to provide a by-pass valve (7) to avoid the flow switch safety device from being activated.

The by-pass valve should be selected as such that at all time the minimum water flow as mentioned under "Water pipework" on page 13 is guaranteed.

## Domestic water heating

When domestic water heating mode is enabled (either manually by the user, or automatically through a schedule timer) the target domestic hot water temperature will be achieved by a combination of the heat exchanger coil and the electrical booster heater.

When the domestic hot water temperature is below the user configured set point, the 3-way valve will be activated to heat the domestic water by means of the heat pump. In case of large domestic hot water demand or a high domestic hot water temperature setting, the booster heater (8) can provide auxiliary heating.



It is possible to connect either a 2-wire or a 3-wire 3-way valve (6). Make sure to fit the 3-way valve correctly. For more details, refer to "Wiring the 3-way valve" on page 20.

### NOTE

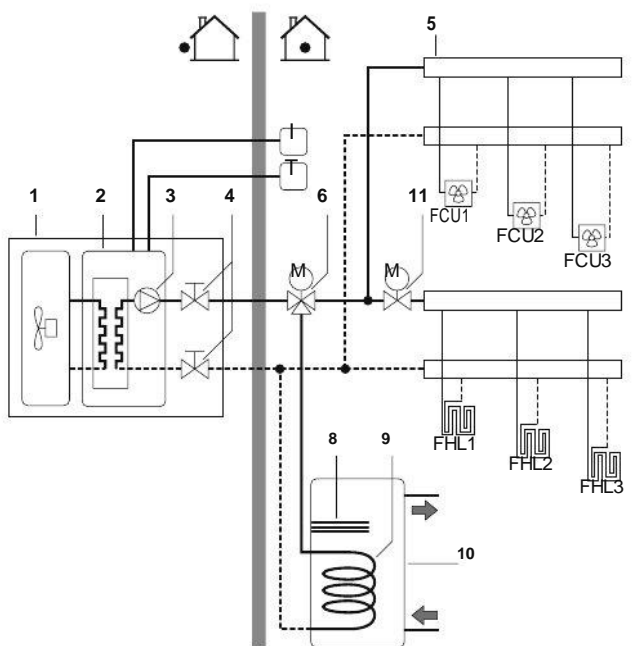


The unit can be configured so that at low outdoor temperatures the domestic water is exclusively heated by the booster heater. This assures that the full capacity of the heat pump is available for space heating.

Details on domestic hot water tank configuration for low outdoor temperatures can be found under "Field settings" on page 25, field settings [5-02] to [5-04].

## Application 3

*Space cooling and heating application with a **room thermostat suitable for heating/cooling changeover** connected to the unit. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only. Domestic hot water is provided through the domestic hot water tank which is connected to the unit.*



1	Unit	10	Domestic hot water tank
2	Heat exchanger	11	Motorised 2-way valve (field supply)
3	Pump		
4	Shut-off valve	FCU1..3	Fan coil unit (field supply)
5	Collector (field supply)	FHL1..3	Floor heating loop (field supply)
6	Motorised 3-way valve (optional)	T	Room thermostat with heating/cooling switch (optional)
8	Booster heater	I	User interface
9	Heat exchanger coil		

## Pump operation and space heating and cooling

According to the season, the customer will select cooling or heating on the room thermostat (T). This selection is not possible by operating the user interface.

When space heating/cooling is requested by the room thermostat (T), the pump will start operating and the unit (1) will switch to "heating mode"/"cooling mode". The unit (1) will start operating to achieve the target leaving cold/hot water temperature.

In case of cooling mode, the motorised 2-way valve (11) will close as to prevent cold water running through the floor heating loops (FHL).



Make sure to connect the thermostat wires to the correct terminals (see "Connection of the thermostat cable" on page 20) and to configure the DIP switch toggle switches correctly (see "Room thermostat installation configuration" on page 23).



Wiring of the 2-way valve (11) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

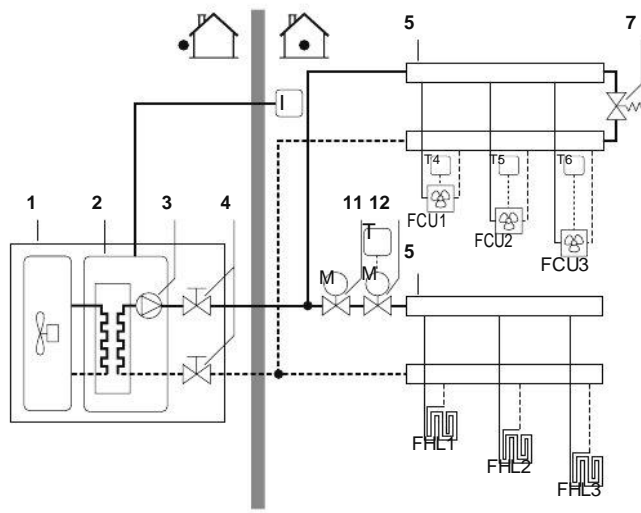
The ON/OFF setting of the heating/cooling operation is done by the room thermostat and cannot be done by the user interface.

## Domestic water heating

Domestic water heating is as described under "Application 2" on page 7.

## Application 4

*Space cooling and heating application **without a room thermostat connected to the unit**, but with a heating only room thermostat controlling the floor heating and a heating/cooling thermostat controlling the fan coil units. Heating is provided through floor heating loops and fan coil units. Cooling is provided through the fan coil units only.*



1	Unit	12	Motorised 2-way valve for activation of the room thermostat (field supply)
2	Heat exchanger		
3	Pump	FCU1..3	Fan coil unit with thermostat (field supply)
4	Shut-off valve	FHL1..3	Floor heating loop (field supply)
5	Collector (field supply)	T	Heating only room thermostat (optional)
7	By-pass valve (field supply)	T4..6	Individual room thermostat for fan coil heated/cooled room (optional)
11	Motorised 2-way valve to shut off the floor heating loops during cooling operation (field supply)	I	User interface

## Pump operation

With no thermostat connected to the unit (1), the pump (3) can be configured to operate either as long as the unit is on, or until the required water temperature is reached.



**NOTE** Details on pump configuration can be found under "Pump operation configuration" on page 23.

## Space heating and cooling

According to the season, the customer will select cooling or heating through the user interface.

The unit (1) will operate in cooling mode or heating mode to achieve the target leaving water temperature.

With the unit in heating mode, the 2-way valve (11) is open. Hot water is provided to both the fan coil units and the floor heating loops.

With the unit in cooling mode, the motorised 2-way valve (11) is closed to prevent cold water running through the floor heating loops (FHL).



When closing several loops in the system by remotely controlled valves, it might be required to install a by-pass valve (7) to avoid the flow switch safety device from being activated. See also "Application 2" on page 7.



Wiring of the 2-way valve (11) is different for a NC (normal closed) valve and a NO (normal open) valve! Make sure to connect to the correct terminal numbers as detailed on the wiring diagram.

The ON/OFF setting of the heating/cooling operation is done by the user interface.

## Application 5

Space heating with an auxiliary boiler (alternating operation)

*Space heating application by either the Daikin unit or by an auxiliary boiler connected in the system. The decision whether either the E(D/B)\* unit or the boiler will operate can be achieved by an auxiliary contact or an E(D/B)\* indoor controlled contact.*

*The auxiliary contact can e.g. be an outdoor temperature thermostat, an electricity tariff contact, a manually operated contact, etc. See "Field wiring configuration A" on page 10.*

*The E(D/B)\* unit controlled contact (also called 'permission signal for the auxiliary boiler') is determined by the outdoor temperature (thermistor located at the outdoor unit). See "Field wiring configuration B" on page 10.*

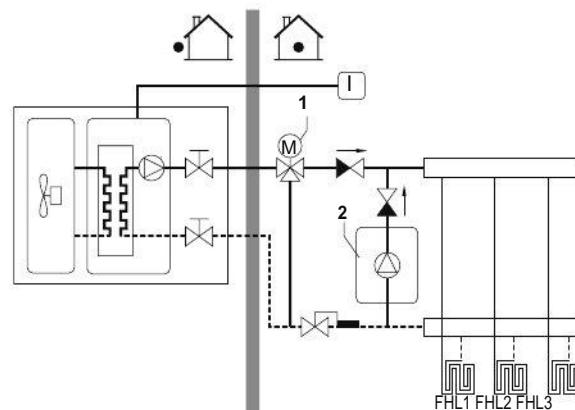
Bivalent operation is only possible for space heating operation, **not** for the domestic water heating operation. Domestic hot water in such an application is always provided by the domestic hot water tank which is connected to the Daikin unit.

The auxiliary boiler must be integrated in the piping work and in the field wiring according to the illustrations below.



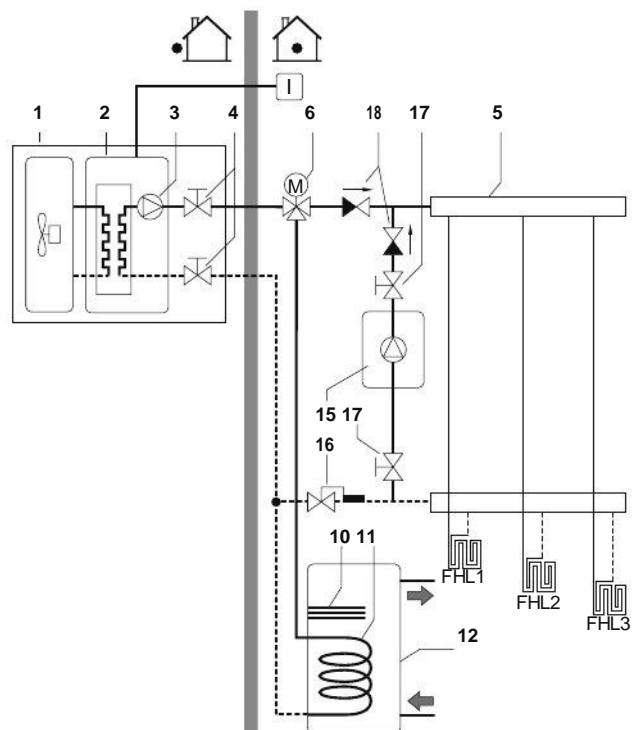
## CAUTION

- Be sure that the boiler and the integration of the boiler in the system is in accordance with relevant local laws and regulations.
- Always install a 3-way valve, even if no domestic hot water tank is installed. This to ensure that the freeze protection function (see "[4-04] Freeze protection function" on page 28) can operate when the boiler is active.



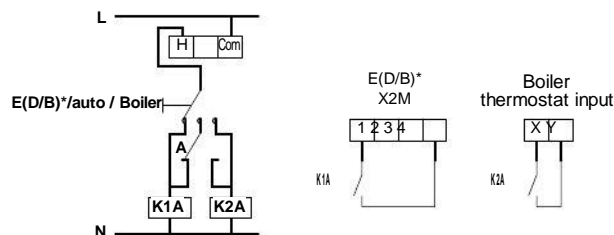
- 1 Motorised 3-way valve
- 2 Boiler

- Daikin can not be put responsible for incorrect or unsafe situations in the boiler system.



- |  |  |
|--|--|
| 1 Outdoor unit   | 12 Domestic hot water tank (optional)      |
| 2 Heat exchanger   | 15 Boiler (field supply)                   |
| 3 Pump   | 15 Aquastat valve (field supply)           |
| 4 Shut-off valve   | 16 Shut-off valve (field supply)           |
| 5 Collector (field supply)   | 17 Non-return valve (field supply)         |
| 6 Motorised 3-way valve (delivered with the domestic hot water tank) | FHL1...3 Floor heating loop (field supply) |
| 10 Booster heater  |  |
| 11 Heat exchanger coil   |  |

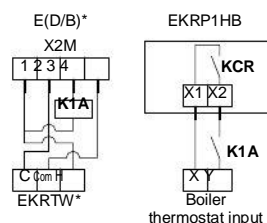
## Field wiring configuration A



**Boiler thermostat input**

- A** Auxiliary contact (normal closed)
- H** Heating demand room thermostat (optional)
- K1A** Auxiliary relay for activation of E(D/B)\* unit (field supply)
- K2A** Auxiliary relay for activation of boiler (field supply)

## Field wiring configuration B



**Boiler thermostat input**

- C** Cooling demand room thermostat (optional)
- H** Heating demand room thermostat (optional)
- Com** Common room thermostat (optional)
- K1A** Auxiliary relay for activation of boiler unit (field supply)
- KCR** Permission signal for the auxiliary boiler

## Operation

### ■ Configuration A

When the room thermostat requests heating, either the E(D/B)\* unit or the boiler starts operating, depending on the position of the auxiliary contact (A).

### ■ Configuration B

When the room thermostat requests heating, either the E(D/B)\* unit or the boiler starts operating, depending on the outdoor temperature (status of "permission signal for the auxiliary boiler").

When the permission is given towards the boiler, the space heating operation by the E(D/B)\* unit will be automatically switched off.

For more details see field setting [C-02~C-04].

## NOTE



### ■ Configuration A

Make sure that auxiliary contact (A) has sufficient differential or time delay so as to avoid frequent changeover between the E(D/B)\* unit and the boiler. If the auxiliary contact (A) is an outdoor temperature thermostat, make sure to install the thermostat in the shade, so that it is not influenced or turned ON/OFF by the sun.

### Configuration B

Make sure that the bivalent hysteresis [C-04] has sufficient differential to avoid frequent changeover between the E(D/B)\* unit and the boiler. As the outdoor temperature is measured via the outdoor unit, air thermistor make sure to install the outdoor unit in the shade, so that it is not influenced by the sun.

Frequent switching may cause corrosion of the boiler in an early stage. Contact the manufacturer of the boiler.

- During heating operation of the E(D/B)\* unit, the unit will operate so as to achieve the target leaving water temperature as set on the user interface. When weather dependent operation is active, the water temperature is determined automatically depending on the outdoor temperature.

During heating operation of the boiler, the boiler will operate so as to achieve the target leaving water temperature as set on the boiler controller.

Never set the target leaving water temperature set point on the boiler controller above 131°F (55°C).

- Make sure to only have 1 expansion vessel in the water circuit. An expansion vessel is already premounted in the Daikin unit.

## NOTE



Make sure to configure the DIP switch SS2-3 on the PCB of the E(D/B)\* switchbox correctly. Refer to "Room thermostat installation configuration" on page 23.

For configuration B: Make sure to configure the field settings [C-02, C-03 and C-04] correctly. Refer to "Bivalent operation" on page 33.



## CAUTION

Make sure that return water to the E(D/B)\* heat exchanger never exceeds 131°F (55°C).

For this reason, never put the target leaving water temperature set point on the boiler controller above 131°F (55°C) and install an aquastat<sup>(a)</sup> valve in the return water flow of the E(D/B)\* unit.

Make sure that the non-return valves (field supply) are correctly installed in the system.

Make sure that the room thermostat (th) is not frequently turned ON/OFF.

Daikin shall not be held liable for any damage resulting from failure to observe this rule.

(a) The aquastat valve must be set for 131°F (55°C) and must operate to close the return water flow to the unit when the measured temperature exceeds 131°F (55°C). When the temperature drops to a lower level, the aquastat valve must operate to open the return water flow to the E(D/B)\* unit again.



Manual permission towards the E(D/B)\* unit on the boiler.

In case only the E(D/B)\* unit should operate in space heating mode, disable the bivalent operation via setting [C-02].

In case only the boiler should operate in space heating mode, increase the bivalent ON temperature [C-03] to 77°F (25°C).

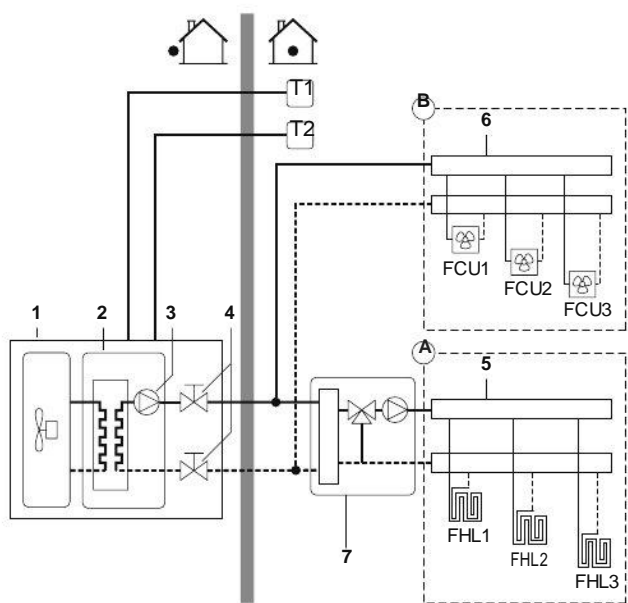
## Application 6

Space heating with room thermostat application through floor heating loops and fan coil units. The floor heating loops and fan coil units require different operating water temperatures.

*The floor heating loops require a lower water temperature in heating mode compared to fan coil units. To achieve these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The fan coil units are directly connected to the unit water circuit and the floor heating loops after the mixing station. The control of this mixing station is not done by the unit.*

*The operation and configuration of the field water circuit is the responsibility of the installer.*

*Daikin only offers a dual set point control function. By this function two set points can be generated. Depending on the required water temperature (floor heating loops and/or fan coil units are required) first set point or second set point can be activated.*



- |                                   |  |
|-----------------------------------|--|
| 1 Outdoor unit                    | 7 Mixing station (field supply)            |
| 2 Heat exchanger                  | T1 Room thermostat for zone A (optional)   |
| 3 Pump                            | T2 Room thermostat for zone B (optional)   |
| 4 Shut-off valve                  | FCU1...3 Fan coil unit (optional)          |
| 5 Collector zone A (field supply) | FHL1...3 Floor heating loop (field supply) |
| 6 Collector zone B (field supply) |  |



The advantage of the dual set point control is that the heat pump will/can operate at the lowest required leaving water temperature when only floor heating is required. Higher leaving water temperatures are only required in case fan coil units are operating. This results in a better performance of the heat pump.

### Pump operation and space heating

When the room thermostat for the floor heating loop (T1) and the fan coil units (T2) are connected to the indoor unit, the pump (4) will operate when there is a request for heating from T1 and/or T2. The outdoor unit will start operating to achieve the target leaving water temperature. The target leaving water temperature depends on which room thermostat is requesting heating.

Set point		Field setting		Thermo status		
Zone A	First	UI	ON	OFF	ON	OFF
Zone B	Second	[7-03]	OFF	ON	ON	OFF
Resulting water temperature		UI	[7-03]	[7-03]	—	
Result pump operation		ON	ON	ON	OFF	

When the room temperature of both zones is above the thermostat set point, the outdoor unit and pump will stop operating.

#### NOTE



- Make sure to connect the thermostat wires to the correct terminals (see "Overview of the unit" on page 11).
- Make sure to configure the field settings [7-02], [7-03] and [7-04] correctly. Refer to "Dual set point control" on page 30.
- Make sure to configure the DIP switch SS2-3 on the PCB of the E(D/B) switch box correctly. Refer to "Room thermostat installation configuration" on page 23.

#### NOTE



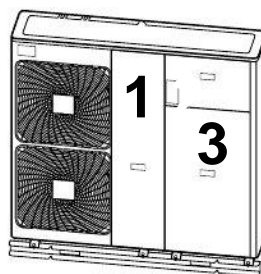
- The request signals for space heating can be implemented in two different ways (installer choice).
  - Thermo ON/OFF signal from room thermostat
  - Status signal (active/not active) from the mixing station
- It is the installers responsibility to make sure no unwanted situations can occur (e.g. too high water temperatures towards floor heating loops, etc.)
- Daikin does not offer any type of mixing station. Dual set point control only provides the possibility to use two set points.
- When only zone A request heating, zone B will be fed with water at a temperature equal to the first set point. This can lead to unwanted heating of zone B.
- When only zone B request heating, the mixing station will be fed with water at a temperature equal to the second set point. Depending on the control of the mixing station, the floor heating loop can still receive water at a temperature equal to set point of the mixing station.



Be aware that the actual water temperature through the floor heating loops depends on the control and setting of the mixing station.

## OVERVIEW OF THE UNIT

### Opening the unit



- Door 1 gives access to the compressor compartment and electrical parts
- Door 2 gives access to the electrical parts of the hydraulic compartment
- Door 3 gives access to the hydraulic compartment



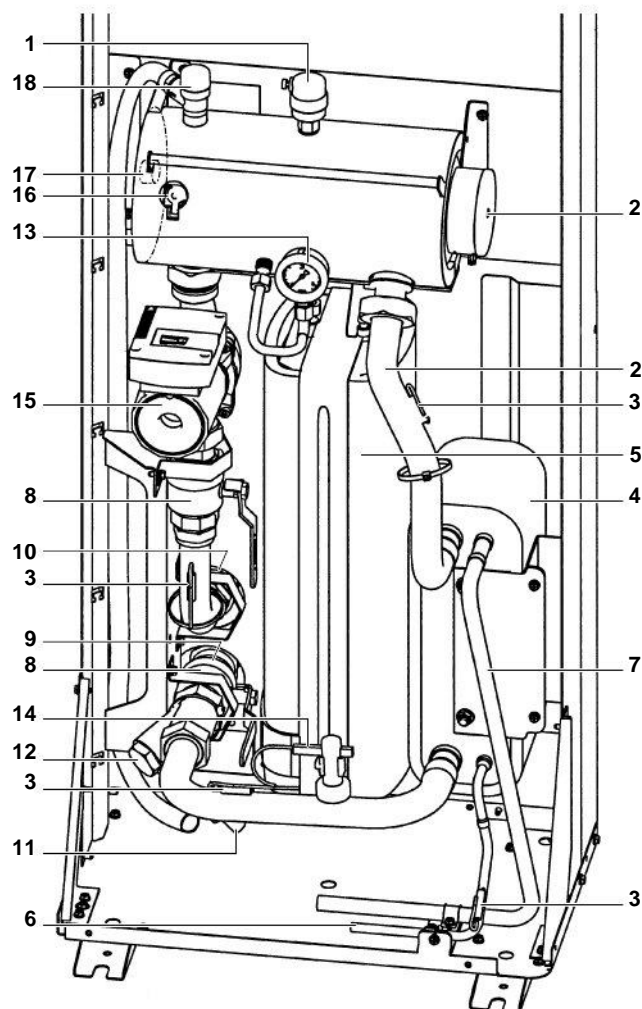
Switch off all power supply — i.e. unit power supply and backup heater and domestic hot water tank power supply (if applicable) — before removing doors 1 and 2.



Parts inside the unit can be hot.

## Main components

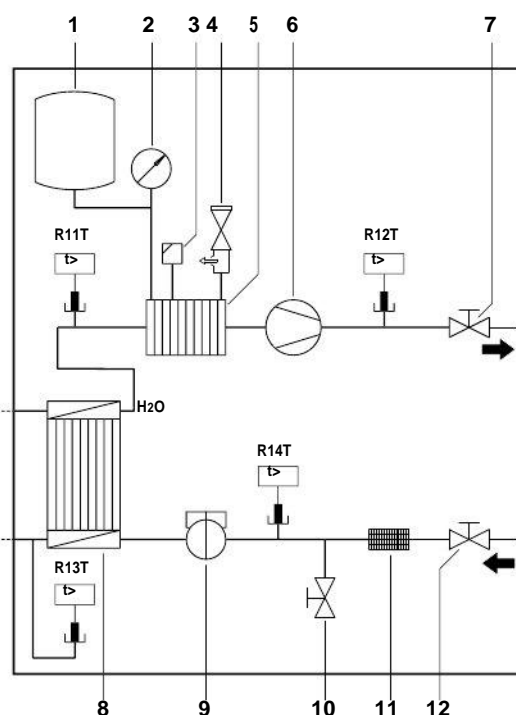
### Hydraulic compartment (door 3)



1. Air purge valve  
Remaining air in the water circuit will be automatically removed via the air purge valve.
2. Backup heater  
The backup heater consists of an electrical heating element that will provide additional heating capacity to the water circuit if the heating capacity of the unit is insufficient due to low outdoor temperatures, it also protects the external water piping from freezing during cold periods.
3. Temperature sensors  
Four temperature sensors determine the water and refrigerant temperature at various points in the water circuit.
4. Heat exchanger
5. Expansion vessel (2.6 gallons (10 l))
6. Refrigerant liquid connection
7. Refrigerant gas connection
8. Shut-off valves  
The shut-off valves on the water inlet connection and water outlet connection allow isolation of the unit water circuit side from the residential water circuit side. This facilitates draining and filter replacement of the unit.
9. Water inlet connection
10. Water outlet connection
11. Drain and fill valve
12. Water filter  
The water filter removes dirt from the water to prevent damage to the pump or blockage of the evaporator. The water filter must be cleaned on a regular base. See "Maintenance and service" on page 37.

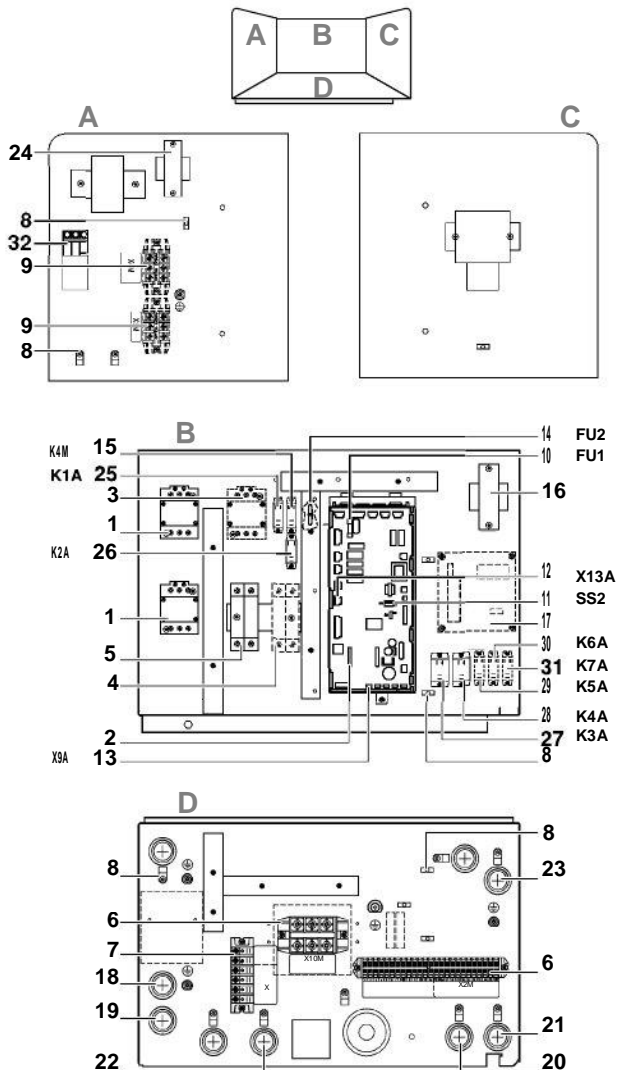
13. Manometer  
The manometer allows readout of the water pressure in the water circuit.
14. Flow switch  
The flow switch checks the flow in the water circuit and protects the heat exchanger against freezing and the pump against damage.
15. Pump  
The pump circulates the water in the water circuit.
16. Backup heater thermal protector  
The backup heater is equipped with a thermal protector. The thermal protector is activated when the temperature becomes too high.
17. Backup heater thermal fuse  
The backup heater is equipped with a thermal fuse. The thermal fuse is blown when the temperature becomes too high (higher than the backup heater thermal protector temperature).
18. Pressure relief valve  
The pressure relief valve prevents excessive water pressure in the water circuit by opening at 43.5 psi (3 bar) and discharging some water.

### Functional diagram of hydraulic compartment (door 3)



- |   |   |      |   |
|---|---|------|---|
| 1 | Expansion vessel                        | 8    | Heat exchanger                              |
| 2 | Manometer                               | 9    | Flow switch                                 |
| 3 | Air purge valve                         | 10   | Drain/fill valve                            |
| 4 | Pressure relief valve                   | 11   | Filter                                      |
| 5 | Backup heater vessel with backup heater | 12   | Shut-off valve water inlet with drain valve |
| 6 | Pump                                    |      |   |
| 7 | Shut-off valve water outlet             | R11T | Temperature sensors                         |
|   |   | R12T |   |
|   |   | R13T |   |
|   |   | R14T |   |

## Switch box main components (door 2)



1. Backup heater contactors K1M and K5M
2. Main PCB  
The main PCB (Printed Circuit Board) controls the functioning of the unit.
3. Booster heater contactor K3M (only for installations with domestic hot water tank)
4. Booster heater circuit breaker F2B (only for installations with domestic hot water tank)  
The circuit breaker protects the booster heater in the domestic hot water tank against overload or short circuit.
5. Backup heater circuit breaker F1B  
The circuit breaker protects the backup heater electrical circuit against overload or short circuit.
6. Terminal blocks  
The terminal blocks allow easy connection of field wiring.
7. Terminal block for backup heater capacity limitation.
8. Cable tie mountings  
The cable tie mountings allow to fix the field wiring with cable ties to the switch box to ensure strain relief.
9. Terminal blocks X3M, X4M (only for installations with domestic hot water tank)
10. PCB fuse FU1
11. DIP switch SS2  
The DIP switch SS2 provides 4 toggle switches to configure certain installation parameters. See "DIP switch settings overview" on page 23.
12. X13A socket  
The X13A socket receives the K3M connector (only for installations with domestic hot water tank).

## 13. X9A socket

The X9A socket receives the thermistor connector (only for installations with domestic hot water tank).

## 14. Pump fuse FU2 (in line fuse)

## 15. Pump relay K4M

## 16. Transformer TR1 for PCB power supply

## 17. A4P Solar/remote alarm input/output PCB (only for installations with solar kit or remote alarm kit)

## 18. Conduit hole to pass through the booster heater power supply cable.

## 19. Conduit hole to pass through the booster heater power supply cable and the thermal protection cable.

## 20. Conduit hole to pass through the room thermostat cable and 2-way valve and 3-way valve control cables.

## 21. Conduit hole to pass through the thermistor cable and user interface cable (and benefit kWh rate cable).

## 22. Conduit hole to pass through the backup heater power supply wiring.

## 23. Conduit hole to pass through optional input/output PCB connection wiring.

## 24. Transformer TR2 for relays and valves

## 25. K1A relay for 3-way valve

## 26. K2A relay for 2-way valve

## 27. K3A relay for room thermostat (optional)

## 28. K4A relay for room thermostat (optional)

## 29. K5A relay for remote alarm (optional)

## 30. K6A relay for remote heating/cooling (optional)

## 31. K7A relay for solar pump

## 32. Terminal block X8M

Terminal block X8M is used to select the power input to transformer TR2

**NOTE** The electrical wiring diagram can be found on the inside of the switch box cover.

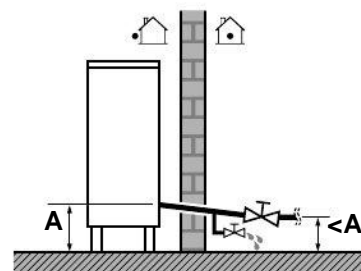
## Water pipework

All piping lengths and distances have been taken into consideration.

Requirement	Value
Maximum allowable distance between the domestic hot water tank and the unit (only for installations with domestic hot water tank). The thermistor cable supplied with the domestic hot water tank is 40 ft (12 m) in length. In order to optimise efficiency Daikin recommends to install the 3-way valve and the domestic hot water tank as close as possible to the unit.	33 ft (10 m)

**NOTE** If the installation is equipped with a domestic hot water tank (optional), please refer to the domestic hot water tank installation manual.

**!** In case of a power supply failure or pump operating failure, drain the system (as suggested in the figure below).



When water is at standstill inside the system, freezing is very likely to happen and damaging the system in the process.

## Checking the water circuit

The units are equipped with a water inlet and water outlet for connection to a water circuit. This circuit must be provided by a licensed technician and must comply with local laws and regulations.



The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.

Before continuing the installation of the unit, check the following points:

- The maximum water pressure = 43 psi (3 bar) + static pressure of pump.
- The maximum water temperature is 149°F (65°C) according to safety device setting.
- Always use materials which are compatible with the water used in the system and with the materials used in the unit.
- Take care that the components installed in the field piping can withstand the water pressure and temperature.
- Drain taps must be provided at all low points of the system to permit complete drainage of the circuit during maintenance. A drain valve is provided in the unit to drain the water from the unit water system.
- Air vents must be provided at all high points of the system. The vents should be located at points which are easily accessible for servicing. An automatic air purge is provided inside the unit. Check that this air purge valve is not tightened too much so that automatic release of air in the water circuit remains possible.

## Checking the water volume and expansion vessel pre-pressure

The unit is equipped with an expansion vessel of 2.6 gallons (10 litre) which has a default pre-pressure of 14.5 psi (1 bar).

To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted and the minimum and maximum water volume must be checked.

- 1 Check that the total water volume in the installation, excluding the internal water volume of the unit, is 5.3 gallons (20 l) minimum. Refer to "Technical specifications" on page 40 to know the internal water volume of the unit.



In most applications this minimum water volume will have a satisfying result.

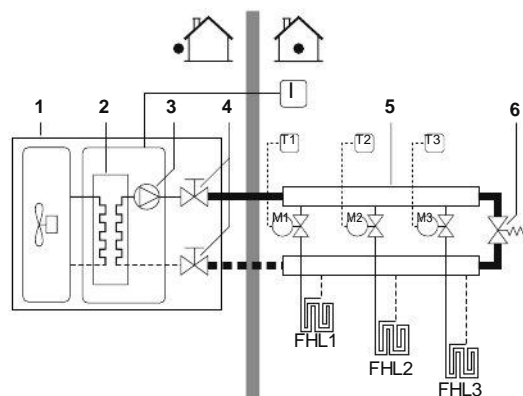
In critical processes or in rooms with a high heat load though, extra water volume might be required.

### NOTE



When circulation in each space heating loop is controlled by remotely controlled valves, it is important that this minimum water volume is kept even if all the valves are closed.

### Example



- |   |                              |         |  |
|---|------------------------------|---------|--|
| 1 | Unit                         | FHL1..3 | Floor heating loop (field supply)                              |
| 2 | Heat exchanger               |         |  |
| 3 | Pump                         | T1..3   | Individual room thermostat (optional)                          |
| 4 | Shut-off valve               |         |  |
| 5 | Collector (field supply)     | M1..3   | Individual motorised valve to control loop FHL1 (field supply) |
| 6 | By-pass valve (field supply) | I       | User interface   |

- 2 Using the table below, determine if the expansion vessel pre-pressure requires adjustment.
- 3 Using the table and instructions below, determine if the total water volume in the installation is below the maximum allowed water volume.

Installation Water volume		
height difference <sup>(a)</sup>	≤ 74 gallons (280 l)	> 74 gallons (280 l)
≤ 23 ft (δ 7 m)	No pre-pressure adjustment required.	Actions required: <ul style="list-style-type: none"> <li>pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel"</li> <li>check if the water volume is lower than maximum allowed water volume (use graph below)</li> </ul>
> 23 ft (δ 7 m)	Actions required: <ul style="list-style-type: none"> <li>pre-pressure must be increased, calculate according to "Calculating the pre-pressure of the expansion vessel"</li> <li>check if the water volume is lower than maximum allowed water volume (use graph below)</li> </ul>	Expansion vessel of the unit too small for the installation.

(a) Installation height difference: height difference (ft)(m) between the highest point of the water circuit and the unit. If the unit is located at the highest point of the installation, the installation height is considered 0 ft (0 m).

## Calculating the pre-pressure of the expansion vessel

The pre-pressure (Pg) to be set depends on the maximum installation height difference (H) and is calculated as below:

$$Pg(\text{psi}) = (H(\text{ft})/32 + 0.3) \times 14.5 \text{ psi}$$

$$Pg(\text{bar}) = (H(\text{m})/10 + 0.3) \text{ bar}$$

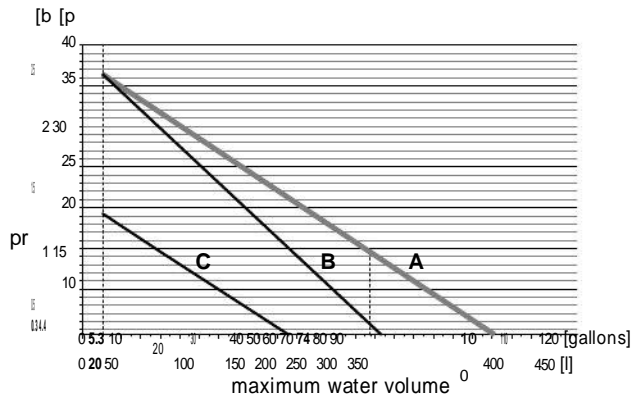


## Checking the maximum allowed water volume

To determine the maximum allowed water volume in the entire circuit, proceed as follows:

- 1 Determine for the calculated pre-pressure ( $P_g$ ) the corresponding maximum water volume using the graph below.
- 2 Check that the total water volume in the entire water circuit is lower than this value.

If this is not the case, the expansion vessel inside the unit is too small for the installation.



pre-pressure	= pre-pressure
maximum water volume	= maximum water volume
A	= System without glycol
B	= System with 25% propylene glycol without domestic hot water tank
C	= System with 25% propylene glycol with domestic hot water tank

(Refer to "Caution: "Use of glycol"" on page 16)

### Example 1

The unit is installed 16.4 ft (5 m) below the highest point in the water circuit. The total water volume in the water circuit is 26.4 gallons (100 l).

In this example, no action or adjustment is required.

### Example 2

The unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 92.5 gallons (350 l).

Result:

- Since 92.5 gallons (350 l) is higher than 74.0 gallons (280 l), the pre-pressure must be decreased (see table above).
- The required pre-pressure is:  
 $P_{g(PSI)} = (H_{ft}/32 + 0.3) \times 14.5 \text{ psi} = (0/32 + 0.3) \times 14.5 \text{ psi} = 4.4 \text{ psi}$   
 $P_{g(bar)} = (H_{m}/10 + 0.3) \text{ bar} = (0/10 + 0.3) \text{ bar} = 0.3 \text{ bar}$
- The corresponding maximum water volume can be read from the graph: approximately 108.0 gallons (410 l).
- Since the total water volume (92.5 gallons (350 l)) is below the maximum water volume (108.0 gallons (410 l)), the expansion vessel suffices for the installation.

## Setting the pre-pressure of the expansion vessel

When it is required to change the default pre-pressure of the expansion vessel (14.5 psi (1 bar)), keep in mind the following guidelines:

- Use only dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.

## Connecting the water circuit

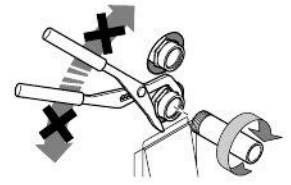
Water connections must be made in accordance with the outlook diagram delivered with the unit, respecting the water in- and outlet.



Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.

If air, moisture or dust gets in the water circuit, problems may occur. Therefore, always take into account the following when connecting the water circuit:

- Use clean pipes only.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall so that no dust and dirt enter.
- Use a good thread sealant for the sealing of the connections. The sealing must be able to withstand the pressures and temperatures of the system.
- When using non-brass metallic piping, make sure to insulate both materials from each other to prevent galvanic corrosion.
- Because brass is a soft material, use appropriate tooling for connecting the water circuit. Inappropriate tooling will cause damage to the pipes.



### NOTE



- The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.
- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between domestic hot water and floor heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

## Protecting the water circuit against freezing

Frost can cause damage to the hydraulic system. As this unit is installed outdoors and thus the hydraulic system is exposed to freezing temperatures, care must be taken to prevent freezing of the system.

All hydraulic parts are insulated to reduce heat loss. Insulation must be foreseen on the field piping.

The unit is already equipped with several features to prevent freezing.

- The software contains special functions using pump and back up heater to protect the complete system against freezing. This function will only be active when the unit is off.
- As extra safety, a heatertape is wound around the piping to protect vital parts of the hydraulic system inside the unit. This heatertape will only be active in case of an abnormal situation concerning the pump and will only protect internal parts of the unit. It can not protect field installed parts outside the unit. Field heater tape must be foreseen by the installer.

However in case of power failure, above mentioned features can not protect the unit from freezing.

If power failure can happen at times the unit is unattended, Daikin recommends adding glycol to the water system. Refer to Caution: "Use of glycol" on page 16.

Refer to "[4-04] Freeze protection function" on page 28.

Depending on the expected lowest outdoor temperature, make sure the water system is filled with a weight concentration of glycol as mentioned in the table below.

Minimum outdoor temperature	Glycol(a)
23°F (−5°C)	10%
14°F (−10°C)	15%
5°F (−15°C)	20%
−10°F (−20°C)	25%



#### WARNING

##### (a) ETHYLENE GLYCOL IS TOXIC

The concentrations mentioned in the table above will not prevent the medium from freezing, but prevent the hydraulics from bursting.



#### Caution: Use of glycol

- Use of glycol for installations with a domestic hot water tank:
  - Only propylene glycol having a toxicity rating or class of 1, as listed in "Clinical Toxicology of Commercial Products, 5th edition" may be used.
  - An approved pressure relief valve of 30 psi (2.0 bar) must be installed at the inlet of the domestic hot water tank heat exchanger.
- The maximum allowed water volume is then reduced according to the figure "Maximum allowed water volume" on page 15.
- Refer to the installation manual of the domestic hot water tank for more information.
- In case of over-pressure when using glycol, be sure to connect the safety valve to a drain pan in order to recover the glycol.



#### Corrosion of the system due to presence of glycol

Uninhibited glycol will turn acidic under the influence of oxygen. This process is accelerated by presence of copper and at higher temperatures. The acidic uninhibited glycol attacks metal surfaces and forms galvanic corrosion cells that cause severe damage to the system.

It is therefore of extreme importance:

- that the water treatment is correctly executed by a qualified water specialist;
- that a glycol with corrosion inhibitors is selected to counteract acids formed by the oxidation of glycols;
- that in case of an installation with a domestic hot water tank, only the use of propylene glycol is allowed. In other installations the use of ethylene glycol is permitted as well;
- that no automotive glycol is used because their corrosion inhibitors have a limited lifetime and contain silicates which can foul or plug the system;
- that galvanized piping is not used in glycol systems since its presence may lead to the precipitation of certain components in the glycol's corrosion inhibitor;
- that it has to be made sure the glycol is compatible with the used materials in the system.

#### NOTE



Be aware of the hygroscopic property of glycol: it absorbs moisture from its environment.

Leaving the cap off the glycol container causes the concentration of water to increase. The glycol concentration is then lower than assumed. And in consequence, freezing can happen after all.

Preventive actions must be taken to ensure minimal exposure of the glycol to air.

## Charging water

- 1 Connect the water supply to a drain and fill valve (see "Main components" on page 12).
- 2 Make sure the automatic air purge valve is open (at least 2 turns).
- 3 Fill with water until the manometer indicates a pressure of approximately 29 psi (2.0 bar). Remove air in the circuit as much as possible using the air purge valves. Air present in the water circuit might cause malfunctioning of the backup heater.
- 4 Check that the backup heater vessel is filled with water by opening the pressure relief valve. Water must flow out of the valve.

#### NOTE



- During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic air purge valves during first operating hours of the system. Additional filling with water afterwards might be required.
- The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 43.5 psi (0.3 bar) to avoid air entering the circuit.
- The unit might dispose some excessive water through the pressure relief valve.
- Water quality must be according to "Safe Drinking water Act (42 U.S.C. 300f)".

## Piping insulation

The complete water circuit, inclusive all piping, must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 1/2 inch (13 mm) with  $\lambda = 0.275 \text{ Btu-inch/hr sq ft.}^\circ\text{F}$  (0.039 W/mK) in order to prevent freezing on the outside water piping.

If the temperature is higher than 86°F (30°C) and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 3/4 inch (20 mm) in order to avoid condensation on the surface of the sealing.

Also refer to "Checks before initial start-up" on page 24.

## Field wiring



### WARNING

- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations.
- Switch off the power supply before making any connections.
- Use only copper wires.
- Never squeeze bundled cables and make sure that it does not come in contact with the piping and sharp edges.  
Make sure no external pressure is applied to the terminal connections.
- All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.
- The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.
- Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.
- Be sure to establish a ground. Do not ground the unit to a utility pipe, surge absorber, or telephone ground. Incomplete ground may cause electrical shock.
- Be sure to install a ground fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.
- Be sure to install the required fuses or circuit breakers.

### Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on high pressure side).
- Secure the electrical wiring with cable ties as shown in figure 2 so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter.

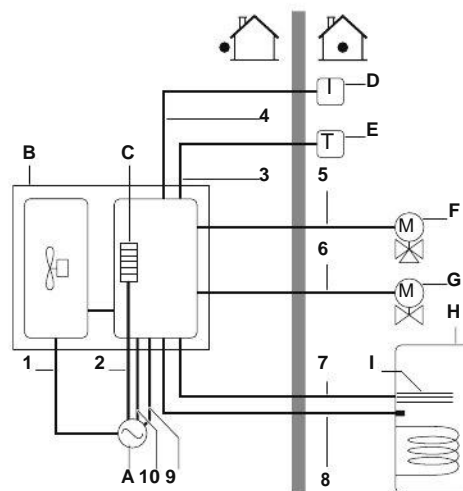


**NOTE** The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).

- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.

## Overview

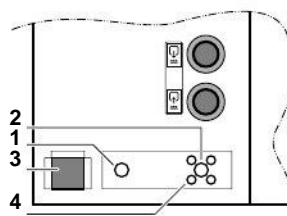
The illustration below gives an overview of the required field wiring between several parts of the installation. Refer also to "Typical application examples" on page 7.



- |          |  |          |  |
|----------|--|----------|--|
| <b>A</b> | Single power supply for unit, backup heater and booster heater | <b>F</b> | 3-way valve for domestic hot water tank (field supply, optional) |
| <b>B</b> | Unit   | <b>G</b> | 2-way valve for cooling mode (field supply, optional)            |
| <b>C</b> | Backup heater  | <b>H</b> | Domestic hot water tank (optional)                               |
| <b>D</b> | User interface   | <b>I</b> | Booster heater (optional)  |
| <b>E</b> | Room thermostat (field supply, optional)                       |          |  |

Item	Description	AC/DC	Required number of conductors	Maximum running current
1	Power supply cable for unit	AC	2+GND	(a)
2	Power supply cable for backup heater	AC	2+GND	(b)
3	Room thermostat cable	AC	3 or 4	100 mA(c)
4	User interface cable	DC	2	100 mA(d)
5	3-way valve control cable	AC	2+GND	100 mA(c)
6	2-way valve control cable	AC	2+GND	100 mA(c)
7	Booster heater power supply and thermal protection cable	AC	4+GND	(b)
8	Thermistor cable	DC	2	(e)
9	Booster heater power supply cable	AC	2+GND	13 A
10	Benefit kWh rate power supply cable (voltage free contact)	DC	2	100 mA(f)

- (a) Refer to nameplate on outdoor unit  
 (b) See table under "Connection of the backup heater power supply" on page 19.  
 (c) Minimum cable section AWG18 (0.75 mm<sup>2</sup>)  
 (d) Cable section AWG18 till AWG16 (0.75 mm<sup>2</sup> till 1.25 mm<sup>2</sup>), maximum length: 1640 ft (500 m).  
 (e) The thermistor and connection wire (40 ft (12 m)) are delivered with the domestic hot water tank.  
 (f) Cable section AWG18 till AWG16 (0.75–1.25 mm<sup>2</sup>), maximum length: 1640 ft (500 m). Voltage free contact shall ensure the minimum applicable load of 15 V DC, 10 mA.



- 1 Knock out hole for unit power supply cable entry
- 2 Knock out hole for backup heater power supply cable entry
- 3 Cap for low voltage cables entry (<30 V)
- 4 Knock out holes for other power cables entry

**CAUTION**

Select all cables and wire sizes in accordance with relevant local laws and regulations.

**WARNING**

After finishing the electric work, confirm that each electric part and terminal inside the electric parts box is connected securely.

**Internal wiring - Parts table**

Refer to the internal wiring diagram supplied with the unit (on the inside of the switch box cover). The abbreviations used are listed below.

**Door 1** compressor compartment and electrical parts

A1P .....	Main PCB
A2P .....	Inverter PCB
A3P .....	Noise filter PCB
A4P .....	PCB
BS1~BS4 .....	Push button switch
C1~C4 .....	Capacitor
DS1 .....	DIP switch
E1H .....	Bottom plate heater
E1HC .....	Crankcase heater
F1U,F3U,F4U ..	Fuse (T 6.3 A/250 V)
F6U .....	Fuse (T 5.0 A/250 V)
F7U,F8U .....	Fuse (F 1.0 A/250 V)
H1P~H7P .....	Orange LED service monitor (A2P)
	H2P: prepare, test = flickering
	H2P: malfunction detection = light up
HAP (A1P) .....	Green LED service monitor
K1R .....	Magnetic relay (Y1S)
K4R .....	Magnetic relay (E1HC)
K10R,K11R .....	Magnetic relay
L1R .....	Reactor
M1C .....	Motor (compressor)
M1F .....	Motor (upper fan)
M2F .....	Motor (lower fan)
PS .....	Switching power supply
Q1DI .....	Field ground fault interrupter (300 mA)
R1,R2 .....	Resistor
R1T .....	Thermistor (air)
R2T .....	Thermistor (discharge)
R3T .....	Thermistor (suction)
R4T .....	Thermistor (heat exchanger)
R5T .....	Thermistor (heat exchanger middle)
R6T .....	Thermistor (liquid)
R10T .....	Thermistor (fin)
RC .....	Signal receiver circuit
S1NPH .....	Pressure sensor
S1PH .....	High pressure switch
TC .....	Signal transmission circuit
V1R .....	Power module
V2R,V3R .....	Diode module
V1T .....	IGBT
X1M .....	Power supply terminal strip
X1Y .....	Connector
Y1E .....	Electronic expansion valve
Y1S .....	Solenoid valve (4 way valve)
Z1C~Z3C .....	Noise filter (ferrite core)
Z1F~Z4F .....	Noise filter

**Door 2** electrical parts of the hydraulic compartment

A11P .....	Main PCB
A12P .....	User interface PCB (remote controller)
A3P .....	Thermostat (EKRTW)(PC=Power Circuit)
A4P .....	Solar/remote alarm PCB (EKRP1HB)
E11H,E12H .....	Backup heater element 1, 2 (6 kW)
E4H .....	Booster heater (3 kW)
E5H .....	Switch box heater
E6H .....	Expansion vessel heater
E7H .....	Plate heat exchanger heater
F1B .....	Fuse backup heater
F1T .....	Thermal fuse backup heater
F2B .....	Fuse booster heater
FU1 .....	Fuse 3.15 A T 250 V for PCB
FU2 .....	Fuse 5 A T 250 V
FU3 .....	Fuse 1 A T 250 V
FuR,FuS .....	Fuse 5 A 250 V for solar/remote alarm PCB
K1A~K4A .....	Relays valves and thermostat
K1M .....	Contactor backup heater step
K3M .....	Contactor booster heater
K4M .....	Pump relay
K5A~K7A .....	Relays for solar/remote alarm PCB
K5M .....	Contactor for backup heater all pole disconnection
M1P .....	Pump
M2S .....	2-way valve for cooling mode
M3S .....	3-way valve: floor heating/domestic hot water
PHC1 .....	Optocoupler input circuit
Q1DI .....	Ground fault circuit interrupter
Q1L .....	Thermal protector backup heater
Q2L,Q3L .....	Thermal protector 1/2 booster heater
R1T .....	Ambient sensor (EKRTW)
R5T .....	Domestic hot water thermistor (EKHW*)
R11T .....	Outlet water heat exchanger thermistor
R12T .....	Outlet water backup heater thermistor
R13T .....	Refrigerant liquid side thermistor
R14T .....	Inlet water thermistor
S1L .....	Flow switch
S1S .....	Solar pump station relay
S1T .....	Thermostat switch box heater
S2S .....	Benefit kWh rate power supply contact
S2T .....	Thermostat expansion vessel heater
S3S .....	Dual set point 1 contact
S3T .....	Thermostat plate heat exchanger
S4S .....	Dual set point 2 contact
SS1 .....	DIP switch
TR1,TR2 .....	Transformer 24 V for PCB, for relays and valves
X1M~X10M .....	Terminal strips
X2Y .....	Connector

## Field wiring guidelines

- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel (door 2).



### WARNING

Switch off all power supply – i.e. unit power supply and backup heater and domestic hot water tank power supply (if applicable) – before removing the switch box service panel.

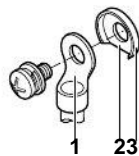
- Cable tie mountings are provided at the bottom of the switch box. Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (optional), require a dedicated power circuit for the **booster heater**. Please refer to the domestic hot water tank installation manual.

Secure the wiring in the order shown below.

- Lay the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely (see figure 2).
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of doors 1 and 2).
- Form the wires and fix the cover firmly so that the cover may be fit in properly.

## Precautions on wiring of power supply

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instruction.



- Round pressure terminal
- Cut out section
- Cup washer

- Do not connect wires of different gauge to the same power supply terminal. (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the below figure.



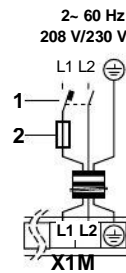
- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- See the table below for tightening torques for the terminal screws.

	Tightening torque	
	lbs-ft	(N·m)
M4 (X1M)	0.88~1.33	1.2~1.8
M5 (X1M)	1.48~2.21	2.0~3.0
M5 (GROUND)	2.21~2.95	3.0~4.0

- Attach a ground fault circuit interrupter and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.

## Specifications of standard wiring components

### Door 1: compressor compartment and electrical parts: X1M



- Ground fault circuit interrupter
- Fuse

Minimum circuit amps (MCA) <sup>(a)</sup>	26.5
Maximum overcurrent protector (MOP)	30 A
Wiring size	Wiring size must comply with the applicable local laws and regulations

(a) Stated values are maximum values (see electrical data for exact values).

### NOTE



The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).

The wiring diagram can be found on the inside of the front plate of the unit.

## Connection of the backup heater power supply

### Power circuit and cable requirements

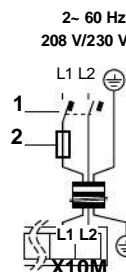


- Be sure to use a dedicated power circuit for the backup heater. Never use a power circuit shared by another appliance.
- Use one and same dedicated power supply for the unit, backup heater and booster heater (domestic hot water tank).

This power circuit must be protected with the required safety devices according to local laws and regulations.

Select the power cable in accordance with relevant local laws and regulations. For the maximum running current of the backup heater, refer to the table below.

### Door 2: electrical parts of the hydraulic compartment: X10M



- Ground fault circuit interrupter
- Fuse


	Backup heater capacity	
	6 kW	3 kW
Backup heater nominal voltage	208 V/230 V	208 V/230 V
Minimum circuit amps (MCA)	28.6	14.3
Maximum overcurrent protector (MOP)	30 A	16 A

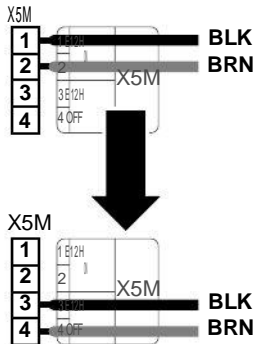
### NOTE



The ground fault circuit interrupter must be a high-speed type breaker of 30 mA (<0.1 s).

## Procedure

- 1 Using the appropriate cable, connect the power circuit to the main circuit breaker as shown on the wiring diagram and in figure 2.
- 2 Connect the ground conductor (yellow/green) to the grounding screw on the X1M terminal.
- 3 Fix the cable with cable ties to the cable tie mountings to ensure strain relief. (Positions are marked with  in figure 2.)  
*Note: only relevant field wiring is shown.*
- 4 If the backup heater capacity is to be set lower than the default value (6 kW), this can be done by reconnecting wires according to following figure. The backup heater capacity is now 3 kW.

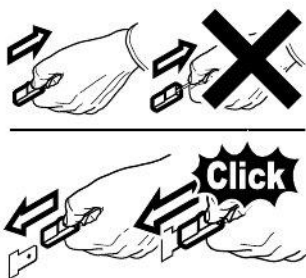
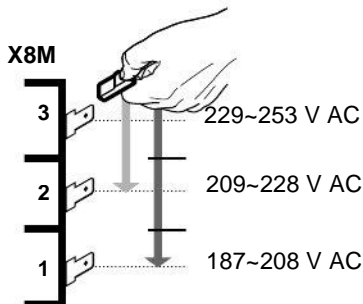


### Power input selection to transformer TR2

This selection is needed to ensure a stable 24 V AC output.

#### Procedure

- 1 Measure main input power.
- 2 Reconnect wire according to the result of measurement.



## Connection of the thermostat cable

Connection of the thermostat cable depends on the application.

See also "Typical application examples" on page 7 and "Room thermostat installation configuration" on page 23 for more information and configuration options on pump operation in combination with a room thermostat.

### Thermostat requirements

- Power supply: battery operated
- Contact voltage: 24 V.

#### Procedure

- 1 Connect the thermostat cable to the appropriate terminals as shown on the wiring diagram and installation manual of the room thermostat kit.
- 2 Fix the cable with cable ties to the cable tie mountings to ensure strain relief.
- 3 Set DIP switch SS2-3 on the PCB to ON. See "Room thermostat installation configuration" on page 23 for more information.

## Connection of the valve control cables

### Valve requirements

- Power supply: 24 V AC
- Maximum running current: 100 mA

### Wiring the 2-way valve

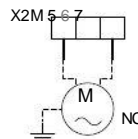
- 1 Using the appropriate cable, connect the valve control cable to the X2M terminal as shown on the wiring diagram.

#### NOTE

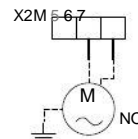


Wiring is different for a NC (normal closed) valve and a NO (normal open) valve. Make sure to connect to the correct terminal numbers as detailed on the wiring diagram and illustrations below.

#### Normal closed (NC) 2-way valve



#### Normal open (NO) 2-way valve



- 2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

### Wiring the 3-way valve

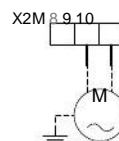
- 1 Using the appropriate cable, connect the valve control cable to the appropriate terminals as shown on the wiring diagram.



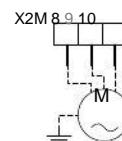
Two types of 3-way valves can be connected. Wiring is different for each type:

- "Spring return 2-wire" type 3-way valve  
The 3-way valve should be fitted as such that when the 3-way valve is idle (not activated), the space heating circuit is selected.
- "SPST 3-wire" type 3-way valve  
The 3-way valve should be fitted as such that when terminal ports 9 and 10 are electrified, the domestic hot water circuit is selected.

#### "Spring return 2-wire" valve



#### "SPST 3-wire" valve



- 2 Fix the cable(s) with cable ties to the cable tie mountings to ensure strain relief.

## Connection to a benefit kWh rate power supply

Electricity companies throughout the world work hard to provide reliable electric service at competitive prices and are often authorized to bill clients at benefit rates. E.g. time-of-use rates, seasonal rates, Wärmepumpentarif in Germany and Austria, ...

This equipment allows for connection to such benefit rate power supply delivery systems.

Consult with the electricity company acting as provider at the site where this equipment is to be installed to know whether it is appropriate to connect the equipment in one of the benefit kWh rate power supply delivery systems available, if any.

When the equipment is connected to such benefit kWh rate power supply, the electricity company is allowed to:

- interrupt power supply to the equipment for certain periods of time;
- demand that the equipment only consumes a limited amount of electricity during certain periods of time.

The unit is designed to receive an input signal by which the unit switches into forced off mode. At that moment, the outdoor unit compressor will not operate.



### CAUTION

**for a benefit kWh rate power supply like illustrated below as type 1**

- If the benefit kWh rate power supply is of the type that power supply is not interrupted, then control of the heaters is still possible.

For the different possibilities of controlling heaters at moments that benefit kWh rate is active, refer to "[D] Benefit kWh rate power supply/Local shift value weather dependent" on page 33.

If heaters must be controlled at moments that the benefit kWh rate power supply is off, then these heaters shall be connected to a separate power supply.

- During the period that the benefit kWh rate is active and power supply is continuous, then stand-by power consumption is possible (PCB, controller, pump, ...).

**for a benefit kWh rate power supply like illustrated below as types 2 or 3**

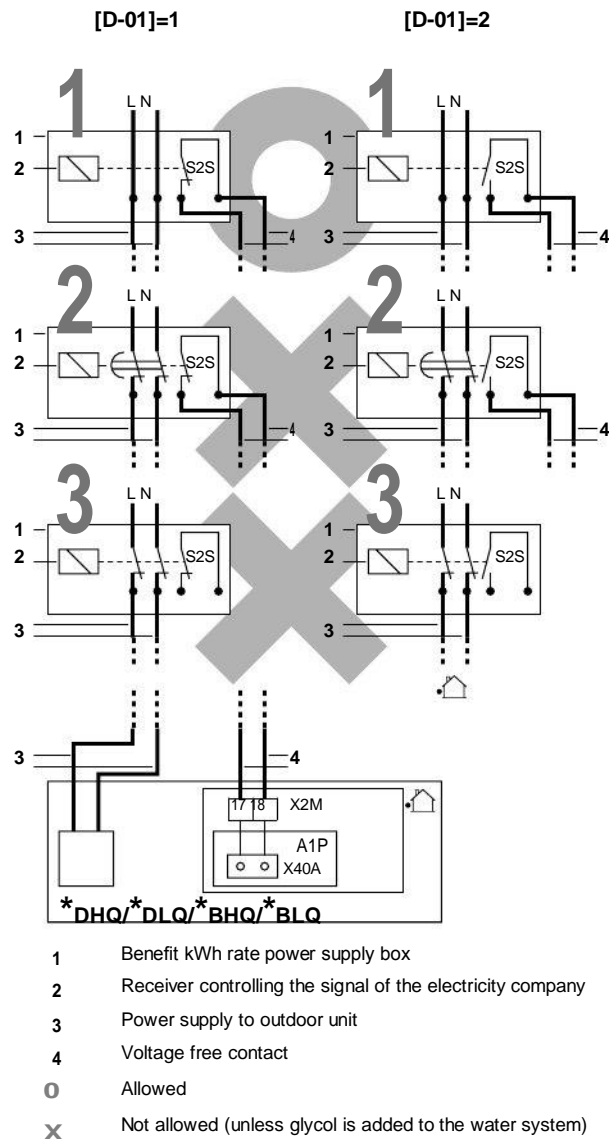
Unless glycol is added to the water system, benefit kWh rate power supplies that completely shut power supply are not allowed for this application because of the water freeze prevention that would not be powered. (Refer to Caution: "Use of glycol" on page 16.)

If during benefit kWh rate power supply the power supply is shut off, then heaters can not be controlled.

- This power supply interruption should not be longer than 2 hours, otherwise the real time clock of the controller will be reset.
- During power supply interruption, the controller display will be blank.

### Possible types of benefit kWh rate power supply

Possible connections and requirements to connect the equipment to such power supply are illustrated in the figure below:



When the outdoor unit is connected to a benefit kWh rate power supply, the voltage free contact of the receiver controlling the benefit kWh rate signal of the electricity company must be connected to clamps 17 and 18 of X2M (as illustrated in the figure above). When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode<sup>(1)</sup>. When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode<sup>(2)</sup>.

#### Type 1

This type of benefit kWh rate power supply is not interrupted.

#### Type 2

This type of benefit kWh rate power supply is interrupted after elapse of time.

#### Type 3

This type of benefit kWh rate power supply is interrupted immediately.

(1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 27.

(2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 27.



- Benefit kWh rate power supplies that completely shut power supply like illustrated above as types 2 and 3 are not allowed for this application because of the water freeze prevention that would not be powered.
- When connecting the equipment to a benefit kWh rate power supply, change field settings [D-01] and both [D-01] and [D-00] in case the benefit kWh rate power supply is of the type that power supply is not interrupted (like illustrated above as type 1). Refer to "[D] Benefit kWh rate power supply/Local shift value weather dependent" on page 33 of chapter "Field settings".



If the benefit kWh rate power supply is of the type that power supply is not interrupted, the unit will be forced to off. Controlling the solar pump is still possible.

When the benefit kWh rate signal is sent, the centralised control indicator e will flash to indicate that the benefit kWh rate is active.

## Installation of the digital controller

The unit is equipped with a digital controller offering a user-friendly way to set up, use and maintain the unit. Before operating the controller, follow this installation procedure.

### Wiring specifications

Wire specification	Value
Type	2 wire
Section	AWG18 - AWG16 (0.75~1.25 mm <sup>2</sup> )
Maximum length	1640 ft (500 m)

**NOTE** The wiring for connection is not included.



### Mounting

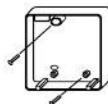


The digital controller, delivered in a kit, has to be mounted indoors.

- Remove the front part of the digital controller. Insert a slotted screwdriver into the slots (1) in the rear part of the digital controller, and remove the front part of the digital controller.



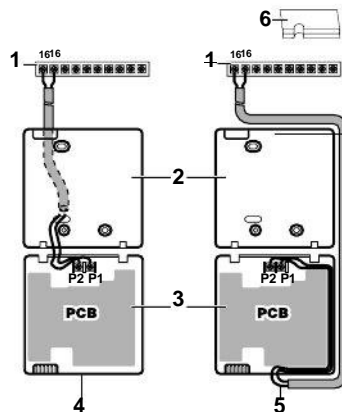
- Fasten the digital controller on a flat surface.



**NOTE** Be careful not to distort the shape of the lower part of the digital controller by over tightening the mounting screws.



- Wire the unit.



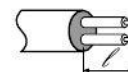
- Unit
- Rear part of the digital controller
- Front part of the digital controller
- Wired from the rear
- Wired from the top
- Notch the part for the wiring to pass through with nippers, etc.

Connect the terminals on top of the front part of the digital controller and the terminals inside the unit (P1 to 16, P2 to 16a).

#### NOTE



- When wiring, run the wiring away from the power supply wiring in order to avoid receiving electric noise (external noise).
- Peel the shield for the part that has to pass through the inside of the digital controller case (1).

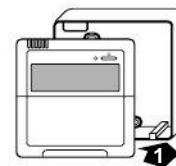


- Reattach the upper part of the digital controller.



Be careful not to pinch the wiring when attaching.

First begin fitting from the clips at the bottom.





## START-UP AND CONFIGURATION

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.



It is important that **all** information in this chapter is read sequentially by the installer and that the system is configured as applicable.

### DIP switch settings overview

DIP switch SS2 is located on the switch box PCB (see "Switch box main components (door 2)" on page 13) and allows configuration of domestic hot water tank installation, room thermostat connection and pump operation.



#### WARNING

Switch off the power supply before opening the switch box service panel and making any changes to the DIP switch settings.



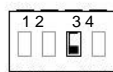
DIP switch SS2	Description	ON	OFF
1	Not applicable for installer	—	(Default)
2	Domestic hot water tank installation (see "Domestic hot water tank installation configuration" on page 24)	Installed	Not installed (Default)
3	Room thermostat connection (see "Room thermostat installation configuration" on page 23)	Room thermostat connected	No room thermostat connected (Default)
4	This setting <sup>(a)</sup> decides the operation mode when there is a simultaneous demand for more space heating/cooling and domestic water heating.	Heating/cooling priority	Priority to highest demand side <sup>(b)</sup>

(a) only applicable in case DIP switch 2 = ON

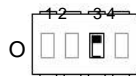
(b) Heating/cooling or domestic water heating mode can be restricted by schedule timer and/or field settings (4, 5, 8).

### Room thermostat installation configuration

- When **no room thermostat** is connected to the unit, toggle switch SS2-3 should be set to **OFF**.



- When a **room thermostat** is connected to the unit, toggle switch SS2-3 should be set to **ON**.



- On the room thermostat, set the hysteresis appropriately to prevent the pump from repeatedly turning on and off (i.e. chattering), and thereby impacting the lifetime of the pump.

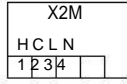
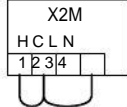
#### NOTE



- When a room thermostat is connected to the unit, the heating and cooling schedule timers are never available. Other schedule timers are not affected. For more information on the schedule timers, refer to the operation manual.
- When a room thermostat is connected to the unit, and the = button or y button is pressed, the centralised control indicator e will flash to indicate that the room thermostat has priority and controls on/off operation and changeover operation.

The following table summarizes the required configuration and thermostat wiring at the terminal block in the switch box. Pump operation is listed in the third column. The three last columns indicate whether the following functionality is available on the user interface (UI) or handled by the thermostat (T):

- space heating or cooling on/off (y)
- heating/cooling changeover (=)
- heating and cooling schedule timers (pr)

Thermostat	Configuration	Pump operation	y	=	pr
No thermostat	· SS2-3=OFF · wiring: (non) 	determined by leaving water temperature (a)	UI	UI	UI
	· SS2-3=ON · wiring: 	on when space heating or cooling is on (y)	UI	UI	UI
Heating only thermostat	· SS2-3=ON · wiring: (see installation manual of the room thermostat kit)	on when heating request by room thermostat	T	—	—
Thermostat with heating/cooling switch	· SS2-3=ON · wiring: (see installation manual of the room thermostat kit)	on when heating request or cooling request by room thermostat	T	T	—

C= Cooling contact

H= Heating contact

L, N = 208 V/230 V AC

(a) The pump will stop when space heating/cooling is turned off or when the water reaches the desired water temperature as set on the user interface. With space heating/cooling turned on, the pump will then run every 5 minutes during 3 minutes to check the water temperature.

### Pump operation configuration

#### NOTE



To set the pump speed, refer to "Setting the pump speed" on page 25.

#### Without room thermostat: DIP switch SS2-3=OFF

When no thermostat is connected to the unit, pump operation will be determined by the leaving water temperature.

To force continuous pump operation when no room thermostat is connected do the following:

- set toggle switch SS2-3 to ON,
- short-circuit the terminal numbers 1-2-4 on the terminal block in the switch box.

#### With room thermostat: DIP switch SS2-3=ON

When a thermostat is connected to the unit, the pump will operate continuously whenever there is heating or cooling demand requested by the thermostat.

#### Dual set point

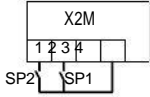
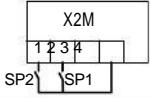
When dual set point is enabled, the pump operation will be determined depending on the status of the DIP switch SS2-3 and set point selection contacts. Refer to the pump operation configurations when the thermostat is connected or not as described above.



When dual set point is enabled, the "forced continuous pump operation" is not possible. When SS2-3 is ON while SP1 and SP2 are both closed, the pump operation will be the same operation as "with room thermostat" and the second set point will be the applicable set point. Refer to "Dual set point control" on page 30.

The following table summarizes the required configuration and wiring at the terminal block (X2M: 1, 2, 4) in the switch box. Pump operation is listed in the third column. The three last columns indicate whether the following functionality is available on the user interface (UI) or handled by the set point selection contacts SP1 and SP2:

- space heating or cooling on/off (y)
- heating/cooling changeover (=)
- heating and cooling schedule timers (pr)

Dual set point				
Configuration	Pump operation	y	=	pr
<ul style="list-style-type: none"> <li>• [7-02]=1</li> <li>• SS2-3=OFF</li> <li>• wiring:</li> </ul> 	determined by leaving water temperature(a)	UI	UI	UI
<ul style="list-style-type: none"> <li>• [7-02]=1</li> <li>• SS2-3=ON</li> <li>• wiring:</li> </ul> 	on when main or/and sub set point is requested	SP2/SP1	UI	—

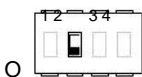
SP1 = First set point contact

SP2 = Second set point contact

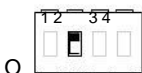
(a) The pump will stop when space heating/cooling is turned off or when the water reaches the desired water temperature as set on the user interface. With space heating/cooling turned on, the pump will then run every 5 minutes during 3 minutes to check the water temperature.

## Domestic hot water tank installation configuration

- When **no domestic hot water tank** is installed, toggle switch SS2-2 should be set to **OFF** (default).



- When a **domestic hot water tank** is installed, toggle switch SS2-2 should be set to **ON**.



When SS2-3 was set to ON without all necessary and correct wiring connections between indoor unit and switchbox of the domestic hot water tank, the error code **AC** will be displayed on the user interface.

## Initial start-up at low outdoor ambient temperatures

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in cracking of concrete floors due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.

To do so, the lowest leaving water set temperature can be decreased to a value between 59°F (15°C) and 77°F (25°C) by adjusting the field setting [9-01] (heating set point lower limit). Refer to "Field settings" on page 25.

### NOTE



Heating between 59°F (15°C) and 77°F (25°C) is performed by the backup heater only.

## Pre-operation checks

### Checks before initial start-up



### DANGER

Switch off the power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring**  
Make sure that the field wiring between local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), and unit and domestic hot water tank has been carried out according to the instructions described in the chapter "Field wiring" on page 17, according to the wiring diagrams and according to local laws and regulations.
- Fuses, circuit breakers, or protection devices**  
Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "Technical specifications" on page 40. Make sure that neither a fuse nor a protection device has been bypassed.
- Backup heater circuit breaker F1B/F3B**  
Do not forget to turn on the backup heater circuit breaker F2B in the switchbox (F1B/F3B depends on the backup heater type). Refer to the wiring diagram.
- Booster heater circuit breaker F2B**  
Do not forget to turn on the booster heater circuit breaker F2B in the switch box (applies only to units with optional domestic hot water tank installed).
- Ground wiring**  
Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring**  
Visually check the switch box on loose connections or damaged electrical components.
- Fixation**  
Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment**  
Check the inside of the unit on damaged components or squeezed pipes.
- Refrigerant leak**  
Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage**  
Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Air purge valve**  
Make sure the air purge valve is open (at least 2 turns).
- Pressure relief valve**  
Check if the backup heater vessel is completely filled with water by operating the pressure relief valve. It should purge water instead of air.

### NOTE



Operating the system with the backup heater not completely filled with water will damage the backup heater!

- Shut-off valves**  
Make sure that the shut-off valves are fully open.



Operating the system with closed valves will damage the pump!

## Powering up the unit

When power supply to the unit is turned on, "88" is displayed on the user interface during its initialisation, which might take up to 30 seconds. During this process the user interface cannot be operated.

## Setting the pump speed

The pump speed can be selected on the pump (see "Main components" on page 12).

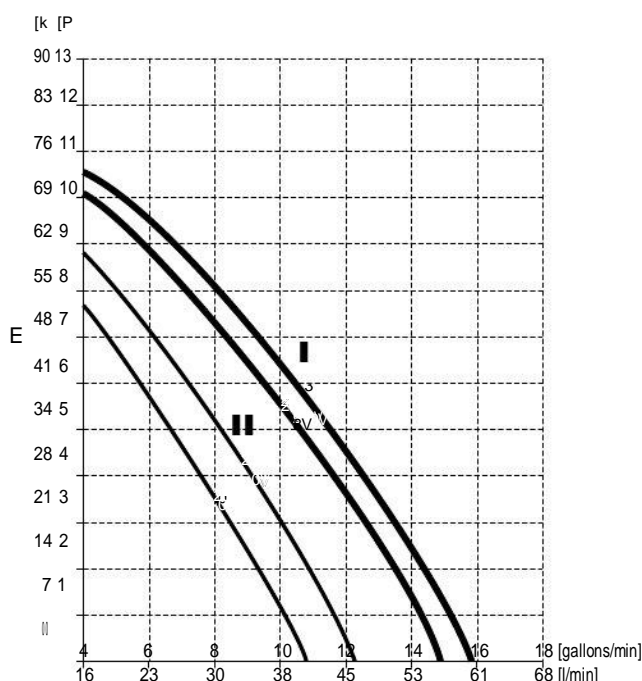
The default setting is high speed (I). If the water flow in the system is too high (e.g., noise of running water in the installation) the speed can be set to low speed (II).

### NOTE



The speed dial on the pump indicates 3 speed settings. However, only 2 speed settings exist: low speed and high speed. The indicated medium speed setting on the speed dial is equal to low speed.

The available external static pressure (ESP, expressed in psi (kPa)) in function of the water flow ((gallons/min) (l/min)) is shown in the graph below.



## Failure diagnosis at the moment of first installation

In case nothing is displayed on the remote controller (the current set temperature does not display), check for any of the following abnormalities before you can diagnose possible malfunction codes.

- Disconnection or wiring error (between power supply and unit and between unit and remote controller).
- The fuse on the PCB may have run out.
- If the remote controller shows "E3", "E4" or "L8" as an error code, there is a possibility that either the stop valves are closed, or that air inlet or air outlet are blocked.
- If the error code "U2" is displayed on the remote controller, check for voltage imbalance.
- If the error code "L4" is displayed on the remote controller, it is possible that air inlet or air outlet are blocked.

## Field settings

The unit shall be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user demand. Thereto, a number of so called field settings are available. These field settings are accessible and programmable through the user interface.

Each field setting is assigned a 3-digit number or code, for example [5-03], which is indicated on the user interface display. The first digit [5] indicates the 'first code' or field setting group. The second and third digit [03] together indicate the 'second code'.

A list of all field settings and default values is given under "Field settings table" on page 35. In this same list, we provided for 2 columns to register the date and value of altered field settings at variance with the default value.

A detailed description of each field setting is given under "Detailed description" on page 26.

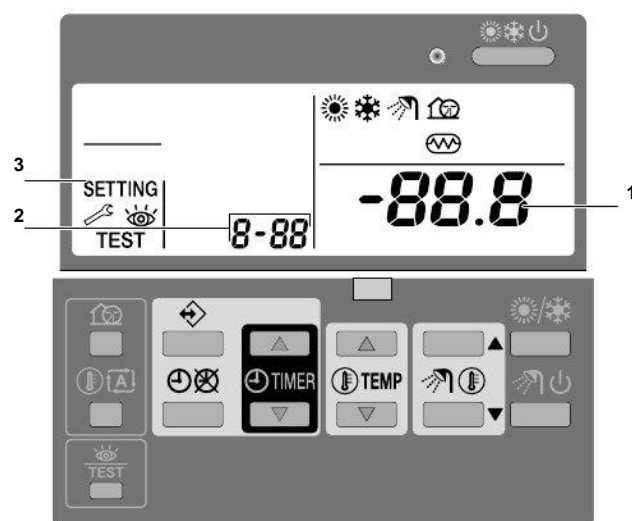
## Procedure

To change one or more field settings, proceed as follows.



Temperature values displayed on the digital controller (user interface) are in °C.

Temperature values in °C are between brackets.  
Conversion from °C to °F is for information only.



- 1 Press the z button for a minimum of 5 seconds to enter FIELD SET MODE.

The \$ icon (3) will be displayed. The current selected field setting code is indicated ; (2), with the set value displayed to the right - (1).

- 2 Press the bgi button to select the appropriate field setting first code.
- 3 Press the bgj button to select the appropriate field setting second code.
- 4 Press the pfi button and pfj button to change the set value of the select field setting.  
Save the new value by pressing the pr button.
- 5 Repeat step 2 through 4 to change other field settings as required.
- 6 When finished, press the z button to exit FIELD SET MODE.
- 7

### NOTE



Changes made to a specific field setting are only stored when the pr button is pressed. Navigating to a new field setting code or pressing the z button will discard the change made.

# NOTE



- Before shipping, the set values have been set as shown under "Field settings table" on page 35.
- When exiting FIELD SET MODE, "88" may be displayed on the user interface LCD while the unit initialises itself.

## Detailed description

### [0] User permission level

If required, certain user interface buttons can be made unavailable for the user.

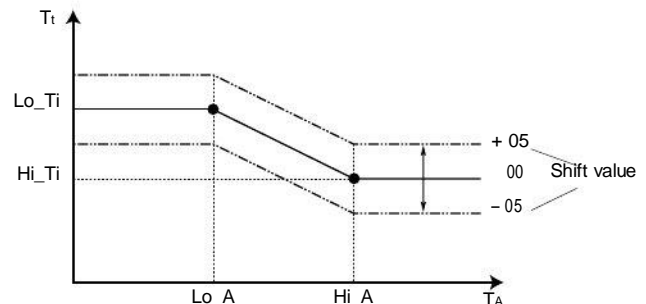
Three permission levels are defined (see the table below). Switching between level 1 and level 2/3 is done by simultaneously pressing buttons pfi and pfj immediately followed by simultaneously pressing buttons s and ba, and keeping all 4 buttons pressed for at least 5 seconds (in normal mode). Note that no indication on the user interface is given. When level 2/3 is selected, the actual permission level — either level 2 or level 3 — is determined by the field setting [0-00].

		Permission level		
Button		1	2	3
Quiet mode button	S	operable	—	—
Weather dependent set point button	ba	operable	—	—
Schedule timer enable/disable button	pr	operable	operable	—
Programming button	<	operable	—	—
Time adjust buttons	pf i	operable	—	—
	pf j	operable	—	—
Inspection/test operation button	z	operable	—	—

### [1] Weather dependent set point (heating operation only)

The weather dependent set point field settings define the parameters for the weather dependent operation of the unit. When weather dependent operation is active the water temperature is determined automatically depending on the outdoor temperature: colder outdoor temperatures will result in warmer water and vice versa. During weather dependent operation, the user has the possibility to shift up or down the target water temperature by a maximum of 41°F (5°C). See the operation manual for more details on weather dependent operation.

- [1-00] Low ambient temperature (Lo\_A): low outdoor temperature.
- [1-01] High ambient temperature (Hi\_A): high outdoor temperature.
- [1-02] Set point at low ambient temperature (Lo\_Ti): the target outgoing water temperature when the outdoor temperature equals or drops below the low ambient temperature (Lo\_A).  
Note that the Lo\_Ti value should be *higher* than Hi\_Ti, as for colder outdoor temperatures (i.e. Lo\_A) warmer water is required.
- [1-03] Set point at high ambient temperature (Hi\_Ti): the target outgoing water temperature when the outdoor temperature equals or rises above the high ambient temperature (Hi\_A).  
Note that the Hi\_Ti value should be *lower* than Lo\_Ti, as for warmer outdoor temperatures (i.e. Hi\_A) less warm water suffices.



$T_t$  Target water temperature

$T_A$  Ambient (outdoor) temperature

Shift value = Shift value

## [2] Disinfection function

Applies only to installations with a domestic hot water tank.

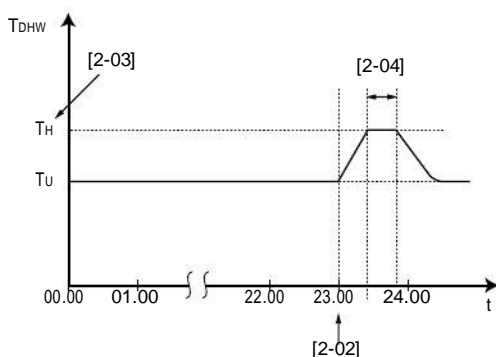
The disinfection function disinfects the domestic hot water tank by periodically heating the domestic water to a specific temperature.



### CAUTION

The disinfection function field settings must be configured by the installer according to local laws and regulations.

- [2-00] Operation interval: day(s) of the week at which the domestic water should be heated.
- [2-01] Status: defines whether the disinfection function is turned on (1) or off (0).
- [2-02] Start time: time of the day at which the domestic water should be heated.
- [2-03] Set point: high water temperature to be reached.
- [2-04] Interval: time period defining how long the set point temperature should be maintained.



$T_{DHW}$	Domestic hot water temperature
$T_U$	User set point temperature (as set on the user interface)
$T_H$	High set point temperature [2-03]
$t$	Time



### WARNING

Be aware that the domestic hot water temperature at the hot water tap will be equal to the value selected in field setting [2-03] after a disinfection operation.

If this high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local laws and regulations.

## [3] Auto restart

When power returns after a power supply failure, the auto restart function reapplies the user interface settings at the time of the power supply failure.



NOTE It is therefore recommended to leave the auto restart function enabled.

Note that with the function disabled the schedule timer will not be activated when power returns to the unit after a power supply failure. Press the pr button to enable the schedule timer again.

- [3-00] Status: defines whether the auto restart function is turned **ON (0)** or **OFF (1)**.



NOTE If the benefit kWh rate power supply is of the type that power supply is interrupted, then always allow the auto restart function.

## [4] Backup heater operation and space heating off temperature

### Backup heater operation

The operation of the backup heater can be enabled or disabled, or it can be disabled depending on operation of the booster heater.

- [4-00] Status: defines whether backup heater operation is enabled (1) or disabled (0).

### NOTE



Even in case the backup heater operation status field setting [4-00] is set to disabled (0), the backup heater can operate during start-up and defrost operation.

- [4-01] Priority: defines whether backup heater and booster heater can operate simultaneously (0), or if the booster heater operation has priority over the backup heater operation (1), or if the backup heater operation has priority over the booster heater operation (2).

### NOTE



When the priority field setting is set to ON (1), space heating performance of the system might be decreased at low outdoor temperatures, since in case of domestic water heating demand the backup heater will not be available for space heating (space heating will still be provided by the heat pump).

When the priority field setting is set to ON (2), domestic water heating performance of the system might be decreased at low outdoor temperatures, since in case of space heating demand the booster heater will not be available for domestic water heating. However domestic water heating by heat pump will still be available.

When the priority field setting is set to OFF (0), make sure that electrical power consumption does not exceed supply limits.

### Space heating off temperature

- [4-02] Space heating off temperature: outdoor temperature above which space heating is turned off, to avoid overheating.

## Booster heater operation

Applies only to installations with a domestic hot water tank.

The operation of the booster heater can be enabled or limited depending on outdoor temperature ( $T_A$ ), domestic hot water temperature ( $T_{DHW}$ ) or operation mode of the heat pump.

- [4-03] Booster heater operation: defines whether the optional booster heater operation is enabled (1) or has certain limitations (0/2/3).

### Explanation of settings of [4-03]

Booster heater will/can only operate if domestic hot water mode is activated (w).

- [4-03]=0, then booster heater operation is only allowed during "[2] Disinfection function" and "Powerful domestic water heating" (see operation manual).  
This setting is only recommended in case the capacity of the heat pump can cover the heating requirements of the house and domestic hot water over the complete heating season. The result of this setting is that the domestic hot water will never be heated by the booster heater except for "[2] Disinfection function" and "Powerful domestic water heating" (see operation manual).



If the booster heater operation is limited ([4-03]=0) and the ambient outdoor temperature  $T_A$  is lower than the field setting to which parameter [5-03] is set and [5-02]=1, then the domestic hot water will not be heated.

The consequence of this setting is that the domestic hot water temperature ( $T_{DHW}$ ) can be maximum the heat pump OFF temperature ( $T_{HP\ OFF}$ ). Refer to setting of [6-00] and [6-01] in "[6]" on page 29.

- [4-03]=1, then booster heater operation is only determined by booster heater OFF temperature ( $T_{BH\ OFF}$ ), booster heater ON temperature ( $T_{BH\ ON}$ ) and/or schedule timer. Refer to setting "[7-00]" on page 30 and "[7-01]" on page 30.
- [4-03]=2, then booster heater operation is only allowed if heat pump is out of "operation range" of heat pump domestic water heating mode ( $T_A < [5-03]$  or  $T_A > 95^\circ\text{F}$  ( $35^\circ\text{C}$ )) or domestic hot water temperature is  $3.6^\circ\text{F}$  ( $2^\circ\text{C}$ ) lower than the heat pump OFF temperature ( $T_{HP\ OFF}$ ) for domestic hot water mode ( $T_{DHW} > T_{HP\ OFF} - 3.6^\circ\text{F}$  ( $2^\circ\text{C}$ )). (Refer to setting [5-03] on page 28, [6-00] on page 29 and [6-01] on page 29). Results in the most optimum coverage of domestic hot water heated by the pump.
- [4-03]=3, then booster heater operation is the same as setting 1, except that booster heater is OFF when the heat pump is active in domestic hot water mode. The consequence of this functionality is that setting [8-03] is not relevant.  
Results in optimum coverage of domestic hot water heated by heat pump in relation with [8-04].



- When setting [4-03]=1/2/3, the booster heater operation can still be restricted by the schedule timer as well. I.e., when booster heater operation is preferred during certain period of the day. (See operation manual)
- When setting [4-03]=2, the booster heater will be allowed to operate when  $T_A < [5-03]$  independent of the status of [5-02]. If bivalent operation is enabled and permission signal for auxiliary boiler is ON, the booster heater will be restricted even when  $T_A < [5-03]$ . (See "[C-02]" on page 33).
- Booster heater is always allowed during powerful and disinfection function, except for the period that the backup heater operation is required for safety reasons and [4-02]=1.

- [4-04] Freeze protection function: avoids freezing of the water piping between home and unit. In case of low ambient temperatures it will activate the pump and in case of low water temperatures it will additionally activate the backup heater.  
Default freeze protection function takes into account freezing of water piping which is insufficiently insulated.  
Basically it means that the pump is activated whenever ambient temperatures become close to freezing, independently of the working temperature.

## [5] Equilibrium temperature and space heating priority temperature

**Equilibrium temperature** — The 'equilibrium temperature' field settings apply to operation of the **backup heater**.

When the equilibrium temperature function is enabled, operation of the backup heater is restricted to low outdoor temperatures, i.e. when the outdoor temperature equals or drops below the specified equilibrium temperature. When the function is disabled, operation of the backup heater is possible at all outdoor temperatures. Enabling this function reduces the working time of the backup heater.

- [5-00] Equilibrium temperature status: specifies whether the equilibrium temperature function is enabled (1) or disabled (0).
- [5-01] Equilibrium temperature: outdoor temperature below which operation of the backup heater is allowed.

**Space heating priority temperature** — Applies only to installations with a domestic hot water tank. — The 'space heating priority temperature' field settings apply to operation of the 3-way valve and the **booster heater** in the domestic hot water tank.

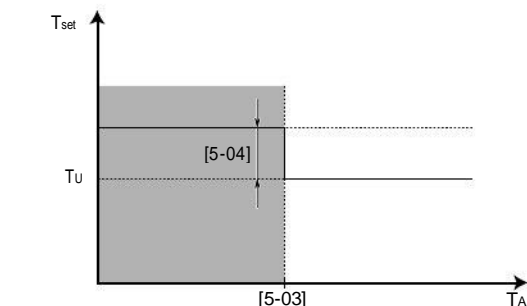
When the space heating priority function is enabled, it is assured that the full capacity of the heat pump is used for space heating only when the outdoor temperature equals or drops below the specified space heating priority temperature, i.e. low outdoor temperature. In this case the domestic hot water will only be heated by the booster heater.

- [5-02] Space heating priority status: specifies whether space heating priority is enabled (1) or disabled (0).
- [5-03] Space heating priority temperature: outdoor temperature below which the domestic hot water will be heated by the booster heater only, i.e. low outdoor temperature.



If the booster heater operation is limited ([4-03]=0) and the ambient outdoor temperature  $T_A$  is lower than the field setting to which parameter [5-03] is set and [5-02]=1, then the domestic hot water will not be heated.

- [5-04] Set point correction for domestic hot water temperature: set point correction for the desired domestic hot water temperature, to be applied at low outdoor temperature when space heating priority is enabled. The corrected (higher) set point will make sure that the *total* heat capacity of the water in the tank remains approximately unchanged, by compensating for the colder bottom water layer of the tank (because the heat exchanger coil is not operational) with a warmer top layer.



$T_{set}$  Domestic hot water set point temperature  
 $T_U$  User set point (as set on the user interface)  
 $T_A$  Ambient (outdoor) temperature  
 ■ Space heating priority



#### WARNING

Be aware that the domestic hot water temperature will be automatically increased with the value selected in field setting [5-04] (if the outdoor temperature drops below field setting [5-03]) compare to the user set point for domestic hot water ( $T_U$ ). Refer to field setting [5-03], [7-00] and the operation manual to select preferable set point.

If this high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local laws and regulations.

#### [6] DT for heat pump domestic water heating mode

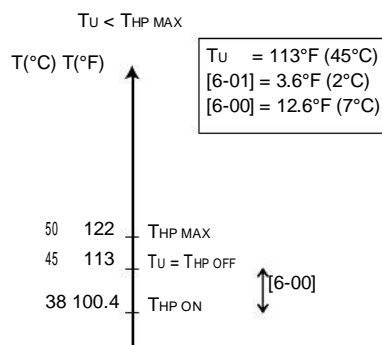
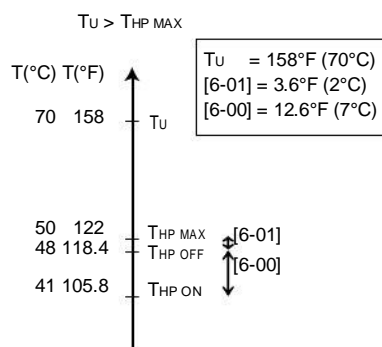
Applies only to installations with a domestic hot water tank.

The 'DT (temperature difference) for heat pump domestic water heating mode' field settings determine the temperatures at which heating of the domestic hot water by the heat pump will be started (i.e., the heat pump ON temperature) and stopped (i.e., the heat pump OFF temperature).

When the domestic hot water temperature drops below the heat pump ON temperature ( $T_{HP ON}$ ), heating of the domestic hot water by the heat pump will be started. As soon as the domestic hot water temperature reaches the heat pump OFF temperature ( $T_{HP OFF}$ ) or the user set point temperature ( $T_U$ ), heating of the domestic hot water by the heat pump will be stopped (by switching the 3-way valve).

The heat pump OFF temperature, and the heat pump ON temperature, and its relation with field settings [6-00] and [6-01] are explained in the illustration below.

- [6-00] Start: temperature difference determining the heat pump ON temperature ( $T_{HP ON}$ ). See illustration.
- [6-01] Stop: temperature difference determining the heat pump OFF temperature ( $T_{HP OFF}$ ). See illustration.



$T_U$  User set point temperature (as set on the user interface)  
 $T_{HP MAX}$  Maximum heat pump temperature at sensor in domestic hot water tank (122°F)(50°C)(depending on  $T_A$ )(a)  
 $T_{HP OFF}$  Heat pump OFF temperature  
 $T_{HP ON}$  Heat pump ON temperature

(a) 122°F (50°C) =  $T_{HP MAX}$  at  $T_A \leq 77^\circ\text{F}$  (25°C).  
 118.4°F (48°C) =  $T_{HP MAX}$  at  $T_A > 77^\circ\text{F}$  (25°C).



The maximum domestic hot water temperature that can be reached with the heat pump is 122°F (50°C). It is advised to select  $T_{HP OFF}$  not higher than 118.4°F (48°C) in order to improve performance of the heat pump during domestic water heating mode.

When setting [4-03]=0 or 2 special attention to setting [6-00] is recommended. A good balance between the required domestic hot water temperature and heat pump ON temperature ( $T_{HP ON}$ ) is a must.

## [7] DT for booster heater and dual set point control

### DT for booster heater

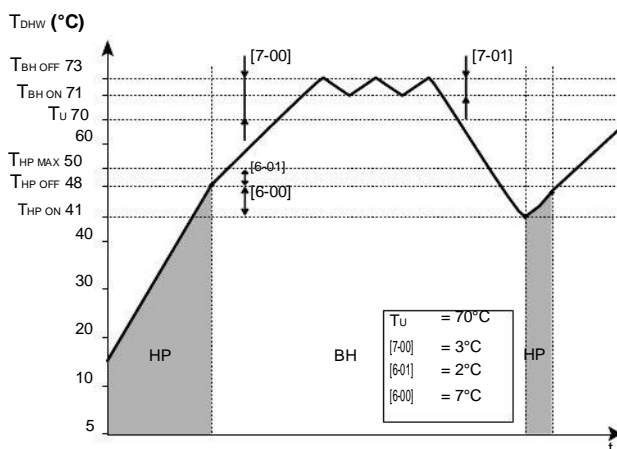
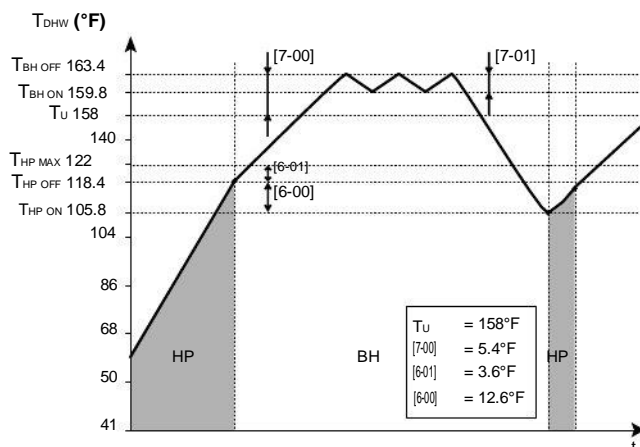
Applies only to installations with a domestic hot water tank.

When the domestic hot water is heated and the domestic hot water set point temperature (as set by the user) has been reached, the booster heater will continue to heat the domestic hot water to a temperature a few degrees above the set point temperature, i.e. the booster heater OFF temperature. These extra degrees are specified by the domestic hot water step length field setting. Correct setting prevents the booster heater from repeatedly turning on and off (i.e. chattering) to maintain the domestic hot water set point temperature. Note: the booster heater will turn back on when the domestic hot water temperature drops [7-01] (field setting) below the booster heater OFF temperature.



If the schedule timer for booster heater (see the operation manual) is active, the booster heater will only operate if allowed by this schedule timer.

■ [7-00] Domestic hot water step length: temperature difference above the domestic hot water set point temperature before the booster heater is turned off.



BH Booster heater

HP Heat pump. If heating up time by the heat pump takes too long, auxiliary heating by the booster heater can take place

T<sub>BH OFF</sub> Booster heater OFF temperature ( $T_U + [7-00]$ )

T<sub>BH ON</sub> Booster heater ON temperature  
 $((T_{BH OFF} - 4^\circ\text{F}) (T_{BH OFF} - 2^\circ\text{C}))$

T<sub>HP MAX</sub> Maximum heat pump temperature at sensor in domestic hot water tank

T<sub>HP OFF</sub> Heat pump OFF temperature ( $T_{HP MAX} - [6-01]$ )

T<sub>HP ON</sub> Heat pump ON temperature ( $T_{HP OFF} - [6-00]$ )

T<sub>DHW</sub> Domestic hot water temperature

T<sub>U</sub> User set point temperature (as set on the user interface)

t Time



### WARNING

Be aware that the domestic hot water temperature will be automatically increased (always) with the value selected in field setting [7-00] compare to the user set point for domestic hot water (T<sub>U</sub>). Refer to field setting [7-00] and the operation manual to select preferable set point.

If this high water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to local laws and regulations.



If the booster heater operation is limited ([4-03]=0), then set point of field setting parameter [7-00] has only meaning for powerful domestic water heating.

■ [7-01] Hysteresis value booster heater: temperature difference determining the booster heater ON temperature (T<sub>BH ON</sub>).  $T_{BH ON} = T_{BH OFF} - [7-01]$



The minimum value for booster heater ON temperature (T<sub>BH ON</sub>) is 3.6°F (2°C) (fixed) below heat pump OFF temperature (T<sub>HP OFF</sub>).

### Dual set point control

Applies only to installations with different heat emitter which require different set points.

Dual set point control makes it possible to generate 2 different set points.



NOTE There is no indication available which set point is active!

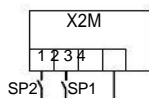
- [7-02] Dual set point control status: defines whether the dual set point control is enabled (1) or disabled (0).
- [7-03] Second set point heating: specifies the second set point temperature in heating operation.
- [7-04] Second set point cooling: specifies the second set point temperature in cooling operation.



# NOTE



- The first set point heating/cooling is the set point selected on the user interface.
  - In heating mode the first set point can be a fixed value or weather dependent.
  - In cooling mode the first set point is always a fixed value.
- The second set point heating [7-03] should be linked to the heat emitters which requires the highest set point in heating mode. Example: fan coil unit.
- The second set point cooling [7-04] should be linked to the heat emitters which requires the lowest set point in cooling mode. Example: fan coil unit.
- The actual second set point heating value depends on the selected value of setting [7-03].
  - In case [7-03]=1.8~43.2°F (1~24°C), the actual second set point will be first set point heating increased with [7-03] (the maximum is 131°F (55°C)).  
In this way the second set point heating is linked to the first set point heating.
  - In case [7-03]=77~131°F (25~55°C), the actual second set point heating is equal to [7-03].
- The selection of second set point or first set point is determined by the terminals (X2M: 1, 2, 4). The second set point has always priority on the first set point.



SP1 First set point contact  
SP2 Second set point contact



When dual set point control is enabled, heating/cooling selection always has to be done on the user interface.

# NOTE



It is the responsibility of the installer to make sure no unwanted situations can occur.

It is very important that the water temperature to the floor heating loops never becomes too high in heating mode or never too cold in cooling mode. Failure to observe this rule can result in construction damage or discomfort. For example in cooling mode condensation on the floor can occur when water towards the floor heating loops is too cold (dew point).

## [8] Domestic water heating mode timer

Applies only to installations with a domestic hot water tank.

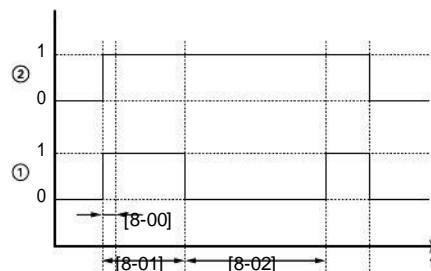
The 'domestic water heating mode timer' field settings defines the minimum and maximum domestic water heating times, minimum time between two domestic water heating cycles by heat pump, and booster heater delay time.

- [8-00] Minimum running time: specifies the minimum time period during which heat pump domestic water heating mode should be activated, even when the target domestic hot water temperature for heat pump (T<sub>HP OFF</sub>) has already been reached.
- [8-01] Maximum running time: specifies the maximum time period during which heat pump domestic water heating mode can be activated, even when the target domestic hot water temperature for heat pump (T<sub>HP OFF</sub>) has not yet been reached.  
The actual maximum running time will automatically variate between [8-01] and [8-01]+[8-04] depending on the outdoor temperature. See figure in chapter "[8-04]" on page 32.



Note that when the unit is configured to work with a room thermostat (refer to "Room thermostat installation configuration" on page 23), the maximum running timer will only be taken into account when there is a request for space cooling or space heating. When there is no request for room cooling or room heating, domestic water heating by the heat pump will continue until the 'heat pump OFF temperature' (see field settings [6] on page 29) is reached. When no room thermostat is installed, the timer is always taken into account.

- [8-02] Anti-recycling time: specifies the minimum required interval between two heat pump domestic water heating mode cycles.  
The actual anti-recycling time will automatically variate between [8-02] and 0 depending on the outdoor temperature. See figure in chapter "[8-04]" on page 32.



- 1 Domestic water heating (1 = active, 0 = not active)  
2 Hot water request (1 = request, 0 = no request)  
t Time

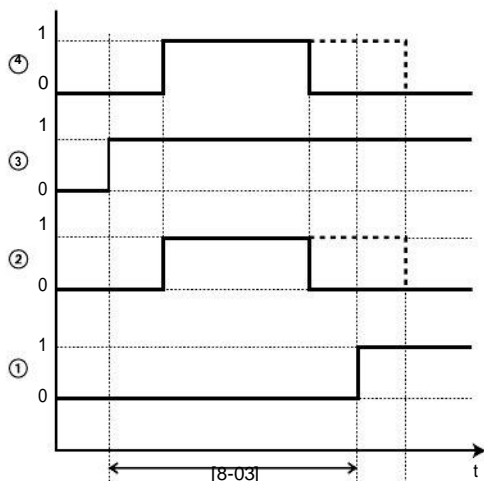


If the outdoor temperature is higher than the field setting to which parameter [4-02] is set, then field settings of parameters [8-01], [8-02], and [8-04] are not considered.

- [8-03] Booster heater delay time: specifies the start-up time delay of the booster heater operation when heat pump domestic water heating mode is active.



- When heat pump is active in domestic water heating mode, the delay time of booster heater is [8-03].
- When heat pump is not active in domestic water heating mode, the delay time is 20 min.
- The delay timer starts from booster heater ON temperature ( $T_{BH ON}$ )



- 1 Booster heater operation (1 = active, 0 = not active)
- 2 Heat pump domestic water heating mode (1 = active, 0 = not active)
- 3 Hot water request for booster heater (1 = request, 0 = no request)
- 4 Hot water request for heat pump (1 = request, 0 = no request)
- t Time

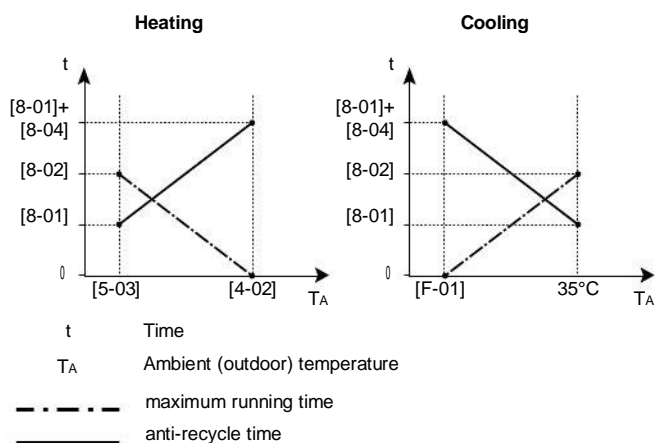


- By adapting the booster heater delay time versus the maximum running time, an optional balance can be found between the energy efficiency and the heat up time.
- However, if the booster heater delay time is set too high, it might take a long time before the domestic hot water reaches its set temperature upon domestic hot water mode request.
- The purpose of [8-03] is to delay the booster heater in relation with the heat pump operation time in domestic water heating mode.
- The setting [8-03] has only meaning if setting [4-03]=1. Setting [4-03]=0/2/3 limits the booster heater automatically in relation to heat pump operation time in domestic water heating mode.
- Take care that [8-03] is always in relation with the maximum running time [8-01].

Example: [4-03]=1

	Energy saving settings	Quick heating settings (default)
[8-01]	20~95 min	30 min
[8-03]	[8-01] + 20 min	20 min

- [8-04] Additional running time at [4-02]/[F-01]: specifies the additional running time on the maximum running time at outdoor temperature [4-02] or [F-01]. See figure below.



The full advantage of [8-04] will be applicable if setting [4-03] is not 1.

[9] The purpose of this field setting is to prevent the user from selecting a wrong (i.e., too hot or too cold) leaving water temperature. Thereto the heating temperature set point range and the cooling temperature set point range available to the user can be configured.



#### CAUTION

- In case of a floor heating application, it is important to limit the maximum leaving water temperature at heating operation according to the specifications of the floor heating installation.
- In case of a floor cooling application, it is important to limit the minimum leaving water temperature at cooling operation (field setting of parameter [9-03]) to 60.8~64.4°F (16~18°C) to prevent condensation on the floor.

- [9-00] Heating set point upper limit: maximum leaving water temperature for heating operation.
- [9-01] Heating set point lower limit: minimum leaving water temperature for heating operation.
- [9-02] Cooling set point upper limit: maximum leaving water temperature for cooling operation.
- [9-03] Cooling set point lower limit: minimum leaving water temperature for cooling operation.
- [9-04] Overshoot setting: defines how much the water temperature may rise above the set point before the compressor stops. This function is only applicable in heating mode.

## [A] Quiet mode

This field setting allows to select the desired quiet mode. Two quiet modes are available: quiet mode A and quiet mode B.

In quiet mode A, priority is given to the unit operating quietly under all circumstances. Fan and compressor speed (and thus performance) will be limited to a certain percentage of the speed at normal operation. In certain cases, this might result in reduced performance.

In quiet mode B, quiet operation might be overridden when higher performance is required. In certain cases, this might result in less quiet operation of the unit to meet the requested performance.

- [A-00] Quiet mode type: defines whether quiet mode A (0) or quiet mode B (2) is selected.
- [A-01] Parameter 01: do not change this setting. Leave it set to its default value.

**NOTE** Do not set other values than the ones mentioned.



## [C] Setup on EKR1HB digital I/O PCB

### Solar priority mode

- [C-00] Solar priority mode setting: for information concerning the EKSOLHW solar kit, refer to the installation manual of that kit.

### Alarm output logic

- [C-01] Alarm output logic: defines the logic of the alarm output on the EKR1HB digital I/O PCB.  
[C-01]=0, the alarm output will be powered when an alarm occurs (default).  
[C-01]=1, the alarm output will not be powered when an alarm occurs. This field setting allows for distinction between detection of an alarm and detection of a power failure to the unit.

[C-01]	Alarm	No alarm	No power supply to unit
0 (default)	Closed output	Open output	Open output
1	Open output	Closed output	Open output

### Bivalent operation

Applies only to installations with an auxiliary boiler (alternating operation, parallel connected). The purpose of this function is to determine —based on the outdoor temperature— which heating source can/will provide the space heating, either the Daikin unit or an auxiliary boiler.

The field setting "bivalent operation" apply only the unit space heating operation and the permission signal for the auxiliary boiler.

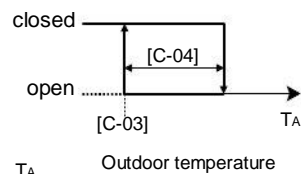
When the "bivalent operation" function is enabled, the unit will stop automatically in space heating operation when the outdoor temperature drops below "bivalent ON temperature" and the permission signal for the auxiliary boiler becomes active.

When the bivalent operation function is disabled, the space heating by unit is possible at all outdoor temperatures (see operation ranges) and permission signal for auxiliary boiler is always deactivated.

- [C-02] Bivalent operation status: defines whether bivalent operation is enabled (1) or disabled (0).
- [C-03] Bivalent ON temperature: defines the outdoor temperature below which the permission signal for the auxiliary boiler will be active (closed, KCR on EKR1HB) and space heating by indoor unit will be stopped.

- [C-04] Bivalent hysteresis: defines the temperature difference between bivalent ON temperature and bivalent OFF temperature.

### Permission signal X1-X2 (EKR1HB)



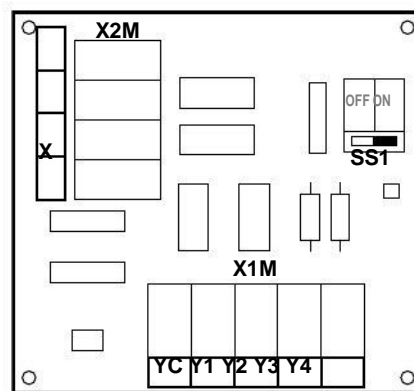
### CAUTION

Make sure to observe all rules mentioned in application 5 when bivalent operation function is enabled.

Daikin shall not be held liable for any damage resulting from failure to observe this rule.



- In case the unit is single phase, the combination of setting [4-03]=0/2 with bivalent operation at low outdoor temperature can result in domestic hot water shortage.
- The bivalent operation function has no impact on the domestic water heating mode. The domestic hot water is still and only heated by the unit.
- The permission signal for the auxiliary boiler is located on the EKR1HB (digital I/O PCB). When it is activated, the contact X1, X2 is closed and open when it is deactivated. See figure for the schematic location of this contact.



## [D] Benefit kWh rate power supply/Local shift value weather dependent

### Benefit kWh rate power supply

- [D-00] Switching off heaters: Defines which heaters are switched off when the benefit kWh rate signal of the electricity company is received.  
If [D-01]=1 or 2 and the benefit kWh rate signal of the electricity company is received, following devices will be switched off:

[D-00]	Compressor	Back up heater	Booster heater
0 (default)	Forced off	Forced off	Forced off
1	Forced off	Forced off	Permitted
2	Forced off	Permitted	Forced off
3	Forced off	Permitted	Permitted



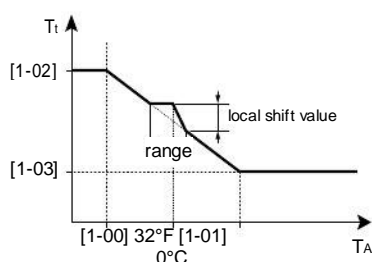
[D-00] settings 1, 2 and 3 are only meaningful if the benefit kWh rate power supply is of the type that power supply is not interrupted,

- [D-01] Unit connection to benefit kWh rate power supply:  
Defines whether or not the outdoor unit is connected to a benefit kWh rate power supply.  
If [D-01]=0, the unit is connected to a normal power supply (default value).  
If [D-01]=1 or 2, the unit is connected to a benefit kWh rate power supply. In this case the wiring requires specific installation like explained in "Connection to a benefit kWh rate power supply" on page 21.  
When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode<sup>(1)</sup>.  
When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode<sup>(2)</sup>.

#### Local shift value weather dependent

The local shift value weather dependent field setting is only relevant in case weather dependent set point (see field setting "[1] Weather dependent set point (heating operation only)" on page 26) is selected.

- [D-03] Local shift value weather dependent: determines the shift value of the weather dependent set point around outdoor temperature of 32°F (0°C).



$T_t$  Target water temperature

$T_A$  Outdoor temperature

range Range

local shift value Local shift value

[1-00], [1-01], [1-02], [1-03] Applicable field setting of the weather dependent set point [1]

[D-03]	Outdoor temperature range ( $T_A$ )	Local shift value
0	—	—
1	28.4°F~35.6°F -2°C~2°C	2
2		4
3	24.8°F~39.2°F -4°C~4°C	2
4		4

#### [E] Unit information readout

- [E-00] Readout of the software version (example: 23)
- [E-01] Readout of the EEPROM version (example: 23)
- [E-02] Readout of the unit model identification (example: 11)
- [E-03] Readout of the liquid refrigerant temperature
- [E-04] Readout of the inlet water temperature

#### NOTE



[E-03] and [E-04] readouts are not permanently refreshed. Temperature readouts are updated after looping through the field setting first codes again only.

- (1) When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 27.
- (2) When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled. Refer to "[3] Auto restart" on page 27.

#### [F] Option setup

##### Pump operation

The pump operation field setting apply to the pump operation logic only when DIP switch SS2-3 is OFF.

When the pump operation function is disabled the pump will stop if the outdoor temperature is higher than the value set by [4-02] or if the outdoor temperature drops below the value set by [F-01]. When the pump operation is enabled, the pump operation is possible at all outdoor temperatures. Refer to "Pump operation configuration" on page 23.

- [F-00] Pump operation: specifies whether the pump operation function is enabled (1) or disabled (0).

##### Space cooling permission

- [F-01] Space cooling permission temperature: defines the outdoor temperature below which space cooling is turned off.



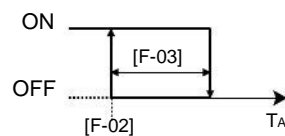
This function is only valid for E(D/B) when space cooling is selected.

##### Bottom plate heater control

Applies only to installation with an outdoor unit E(D/B)LQ or in case the option bottom plate heater kit is installed.

- [F-02] Bottom plate heater ON temperature: defines the outdoor temperature below which the bottom plate heater will be activated by unit in order to prevent ice build-up in the bottom plate of the outdoor unit at lower outdoor temperatures.
- [F-03] Bottom plate heater hysteresis: defines the temperature difference between bottom plate heater ON temperature and the bottom plate heater OFF temperature.

##### Bottom plate heater



$T_A$  Outdoor temperature



#### CAUTION

The bottom plate heater is controlled via X14A. Make sure [F-04] is correctly set.

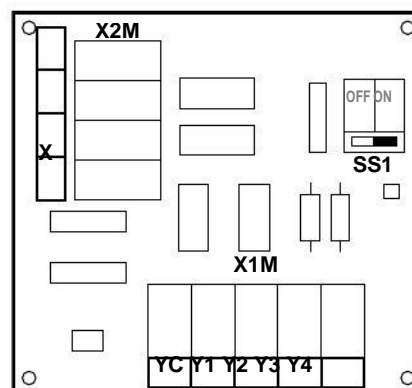
##### Functionality of X14A

- [F-04] Functionality of X14A: specifies if the logic of X14A follows the output signal for the solar kit model (EKSOLHW) (0) or if the logic of X14A follows the output for the bottom plate heater (1).



#### NOTE

Independent from field setting [F-04], the contact X3-X4 (EKRP1HB) follows the logic of the output signal for the solar kit model (EKSOLHW). See figure below for the schematic location of this contact.



## Field settings table



Temperature values displayed on the digital controller (user interface) are in °C.

Temperature values in °C are between brackets. Conversion from °C to °F is for information only.

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
0		<b>User permission level</b>								
	00	User permission level					3	2/3	1	—
1		<b>Weather dependent set point</b>								
	00	Low ambient temperature (Lo_A)					14 (-10)	-4~41 (-20~5)	1.8 (1)	°F (°C)
	01	High ambient temperature (Hi_A)					59 (15)	50~68 (10~20)	1.8 (1)	°F (°C)
	02	Set point at low ambient temperature (Lo_TI)					104 (40)	77~131 (25~55)	1.8 (1)	°F (°C)
	03	Set point at high ambient temperature (Hi_TI)					77 (25)	77~131 (25~55)	1.8 (1)	°F (°C)
2		<b>Disinfection function</b>								
	00	Operation interval					Fri	Mon-Sun, All	—	—
	01	Status					1 (ON)	0/1	—	—
	02	Start time					23:00	0:00~23:00	1:00	hour
	03	Set point					158 (70)	104~176 (40~80)	9 (5)	°F (°C)
	04	Interval					10	5~60	5	min
3		<b>Auto restart</b>								
	00	Status					0 (ON)	0/1	—	—
4		<b>Backup/booster heater operation and space heating off temperature</b>								
	00	Status					1 (ON)	0/1	—	—
	01	Priority					0 (OFF)	0/1/2	—	—
	02	Space heating off temperature					95 (35)	57.2~95 (14~35)	1.8 (1)	°F (°C)
	03	Booster heater operation					3	0/1/2/3	—	—
	04	Freeze-up protection function					0 (active) Read only	—	—	—
5		<b>Equilibrium temperature and space heating priority temperature</b>								
	00	Equilibrium temperature status					1 (ON)	0/1	—	—
	01	Equilibrium temperature					32 (0)	5~95 (-15~35)	1.8 (1)	°F (°C)
	02	Space heating priority status					0 (OFF)	0/1	—	—
	03	Space heating priority temperature					32 (0)	5~68 (-15~20)	1.8 (1)	°F (°C)
	04	Set point correction for domestic hot water temperature					18 (10)	0~36 (0~20)	1.8 (1)	°F (°C)
6		<b>DT for heat pump domestic water heating mode</b>								
	00	Start					3.6 (2)	3.6~36 (2~20)	1.8 (1)	°F (°C)
	01	Stop					3.6 (2)	0~18 (0~10)	1.8 (1)	°F (°C)
	02	Not applicable					0	Read only	—	—
7		<b>DT for booster heater and dual set point control</b>								
	00	Domestic hot water step length					0	0~7.2 (0~4)	1.8 (1)	°F (°C)
	01	Hysteresis value booster heater					3.6 (2)	3.6~72 (2~40)	1.8 (1)	°F (°C)
	02	Dual set point control status					0	0/1	—	—
	03	Second set point heating					18 (10)	1.8~43.2 / 77~131 (1~24 / 25~55)	1.8 (1)	°F (°C)
	04	Second set point cooling					44.6 (7)	41~71.6 (5~22)	1.8 (1)	°F (°C)
8		<b>Domestic water heating mode timer</b>								
	00	Minimum running time					5	0~20	1	min
	01	Maximum running time					30	5~60	5	min
	02	Anti-recycling time					3	0~10	0.5	hour
	03	Booster heater delay time					50	20~95	5	min
	04	Additional running time at [4-02]/[F-01]					95	0~95	5	min

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
g	Cooling and heating set point ranges									
	00	Heating set point upper limit					131 (55)	98.6~131 (37~55)	1.8 (1)	°F (°C)
	01	Heating set point lower limit					77 (25)	59~98.6 (15~37)	1.8 (1)	°F (°C)
	02	Cooling set point upper limit					71.6 (22)	64.4~71.6 (18~22)	1.8 (1)	°F (°C)
	03	Cooling set point lower limit					41 (5)	41~64.4 (5~18)	1.8 (1)	°F (°C)
	04	Overshoot setting(a)					1.8 (1)	1.8~7.2 (1~4)	1.8 (1)	°F (°C)
A	Quiet mode									
	00	Quiet mode type					0	0/2	—	—
	01	Parameter 01					3	—	—	—
	02	Not applicable					1	Read only	—	—
	03	Not applicable					0	Read only	—	—
	04	Not applicable					0	Read only	—	—
b	Not applicable									
	00	Not applicable					0	Read only	—	—
	01	Not applicable					0	Read only	—	—
	02	Not applicable					0	Read only	—	—
	03	Not applicable					0	Read only	—	—
	04	Not applicable					0	Read only	—	—
C	Setup on EKR1HB digital I/O PCB									
	00	Solar priority mode setting					0	0/1	1	—
	01	Alarm output logic					0	0/1	—	—
	02	Bivalent operation status					0	0/1	—	—
	03	Bivalent ON temperature					32 (0)	-13~77 (-25~25)	1.8 (1)	°F (°C)
	04	Bivalent hysteresis					5.4 (3)	3.6~18 (2~10)	1.8 (1)	°F (°C)
D	Benefit kWh rate power supply/local shift value weather dependent									
	00	Switching off heaters					0	0/1/2/3	—	—
	01	Unit connection to benefit kWh rate power supply					0 (OFF)	0/1/2	—	—
	02	Not applicable. Do not change the default value.					0	—	—	—
	03	Local shift value weather dependent					0	0/1/2/3/4	—	—
E	Unit information readout									
	00	Software version					Read only	—	—	—
	01	EEPROM version					Read only	—	—	—
	02	Unit model identification					Read only	—	—	—
	03	Liquid refrigerant temperature					Read only	—	—	°F (°C)
	04	Inlet water temperature					Read only	—	—	°F (°C)
F	Option setup									
	00	Pump operation					0	0/1	—	—
	01	Space cooling permission temperature					68 (20)	50~95 (10~35)	1.8 (1)	°F (°C)
	02	Bottom plate heater ON temperature					37.4 (3)	37.4~50 (3~10)	1.8 (1)	°F (°C)
	03	Bottom plate heater hysteresis					9 (5)	3.6~9 (2~5)	1.8 (1)	°F (°C)
	04	Functionality of X14A					1	0/1	—	—

(a) Only possible to modify the first 3 minutes after power ON.

## TEST RUN AND FINAL CHECK

The installer is obliged to verify correct operation of unit after installation.

### Final check

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all front panels of the unit and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purposes.

#### NOTE



Note that during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

### Automatic test run

When the unit is put into operation (by pressing the **y** button) for the first time, the system will automatically perform a test run in cooling mode. The test run will take up to 3 minutes, during which no specific indication is given on the user interface.

During the automatic test run, it is important to ensure that the water temperature does not drop below 50°F (10°C), which might activate the freeze-up protection and thereby prevent the test run to finish. Should the water temperature drop below 50°F (10°C), press the **h/c** button so the **h** icon is displayed. This will activate the backup heater during the automatic test run and raise the water temperature sufficiently.

If the automatic test run has ended successfully, the system will automatically resume normal operation.

If there are misconnections or malfunctions, an error code will be displayed on the user interface. To resolve the error codes, see "Error codes" on page 39.

#### NOTE



When the unit is put into pump down operation, the automatic test run flag will be cleared. The next time the system is put into operation, the automatic test run will be executed again.

After finishing automatic test run or power ON/OFF, the compressor will operate in the selected operation mode and continue for certain time (set point on the remote controller is overruled during this operation).

### Test run operation (manual)

If required, the installer can perform a manual test run operation at any time to check correct operation of heating, cooling and domestic water heating.

#### Procedure

- 1 Push the **z** button 4 times so the **t** icon will be displayed.
- 2 Depending on the unit model, heating operation, cooling operation or both must be tested as follows (when no action is performed, the user interface will return to normal mode after 10 seconds or by pressing the **z** button once):
  - To test the heating operation push the **h/c** button so the **h** icon is displayed. To start the test run operation press the **y** button.
  - To test the cooling operation push the **h/c** button so the **c** icon is displayed. To start the test run operation press the **y** button.
  - To test the domestic water heating operation push the **v** button. The test run operation will start without pressing the **y** button.

- 3 The test run operation will end automatically after 30 minutes or when reaching the set temperature. The test run operation can be stopped manually by pressing the **z** button once. If there are misconnections or malfunctions, an error code will be displayed on the user interface. Otherwise, the user interface will return to normal operation.
- 4 To resolve the error codes, see "Error codes" on page 39.

#### NOTE



To display the last resolved error code, push the **z** button 1 time. Push the **z** button again 4 times to return to normal mode.

#### NOTE



It is not possible to perform a test run if a forced operation from the unit is in progress. Should forced operation be started during a test run, the test run will be aborted.

## MAINTENANCE AND SERVICE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

This maintenance has to be carried out by your local Daikin technician.



### DANGER: ELECTRIC SHOCK



- Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses (or switch off the circuit breakers) or open protection devices of the unit.
- Make sure that before starting any maintenance or repair activity, also the power supply to the outdoor unit is switched off.
- Do not touch live parts for 10 minutes after the power supply is turned off because of high voltage risk.
- The heater of the compressor may operate even in stop mode.
- Please note that some sections of the electric component box are hot.
- Make sure you do not touch a conductive section.
- Do not rinse the unit. This may cause electric shocks or fire.
- When service panels are removed, live parts can be easily touched by accident. Never leave the unit unattended during installation or servicing when service panel is removed.

The described checks must be executed at least **once a year** by qualified personnel.

- 1 Water pressure  
Check if the water pressure is above 14.5 psi (1 bar). If necessary add water.
- 2 Water filter  
Clean the water filter.
- 3 Water pressure relief valve  
Check for correct operation of the pressure relief valve by turning the red knob on the valve counter-clockwise:
  - If you do not hear a clacking sound, contact your local dealer.
  - In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.
- 4 Pressure relief valve hose  
Check that the pressure relief valve hose is positioned appropriately to drain the water.

- 5 Backup heater vessel insulation cover  
Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.
- 6 Domestic hot water tank pressure relief valve (field supply)  
Applies only to installations with a domestic hot water tank.  
Check for correct operation of the pressure relief valve on the domestic hot water tank.
- 7 Domestic hot water tank booster heater  
Applies only to installations with a domestic hot water tank.  
It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.
- 8 Unit switch box
  - Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.
  - Check for correct operation of contactors K1M, K3M, K5M (applications with domestic hot water tank only) and K4M by use of an ohm meter. All contacts of these contactors must be in open position.
- 9 In case of use of glycol  
(Refer to Caution: "Use of glycol" on page 16)  
  
Document the glycol concentration and the pH-value in the system at least once a year.
  - A pH-value below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
  - When the pH-value is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.

Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

## TROUBLESHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.

This troubleshooting and related corrective actions may only be carried out by your local Daikin technician.

### General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.



#### DANGER

When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances safety devices may be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve, to avoid water dripping out of the unit!

#### NOTE



For problems related to the optional solar kit for domestic water heating, refer to the troubleshooting in the installation manual of that kit.

## General symptoms

**Symptom 1: The unit is turned on (y LED is lit) but the unit is not heating or cooling as expected**

POSSIBLE CAUSES	CORRECTIVE ACTION
The temperature setting is not correct.	Check the controller set point.
The water flow is too low.	<ul style="list-style-type: none"> <li>• Check that all shut off valves of the water circuit are completely open.</li> <li>• Check if the water filter needs cleaning.</li> <li>• Make sure there is no air in the system (purge air).</li> <li>• Check on the manometer that there is sufficient water pressure. The water pressure must be &gt;14.5 psi (1 bar) (water is cold).</li> <li>• Check that the pump speed setting is on the highest speed.</li> <li>• Make sure that the expansion vessel is not broken.</li> <li>• Check that the resistance in the water circuit is not too high for the pump (refer to "Setting the pump speed" on page 25).</li> </ul>
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "Checking the water volume and expansion vessel pre-pressure" on page 14).

**Symptom 2: The unit is turned on but the compressor is not starting (space heating or domestic water heating)**

POSSIBLE CAUSES	CORRECTIVE ACTION
The unit must start up out of its operation range (the water temperature is too low).	<p>In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (59°F (15°C)).</p> <ul style="list-style-type: none"> <li>• Check that the backup heater power supply is correct.</li> <li>• Check that the backup heater thermal fuse is closed.</li> <li>• Check that the backup heater thermal protector is not activated.</li> <li>• Check that the backup heater contactors are not broken.</li> </ul>
The benefit kWh rate power supply settings and electrical connections do not match.	If [D-01]=1 or 2, the wiring requires specific installation like illustrated in "Connection to a benefit kWh rate power supply" on page 21. Other correctly installed configurations are possible, but are to be specific for the type of benefit kWh rate power supply type at this specific site.
The benefit kWh rate signal was sent by the electricity company.	Wait for the power to return.

**Symptom 3: Pump is making noise (cavitation)**

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	<ul style="list-style-type: none"> <li>• Check on the manometer that there is sufficient water pressure. The water pressure must be &gt;14.5 psi (1 bar) (water is cold).</li> <li>• Check that the manometer is not broken.</li> <li>• Check that the expansion vessel is not broken.</li> <li>• Check that the setting of the pre-pressure of the expansion vessel is correct (refer to "Setting the pre-pressure of the expansion vessel" on page 15).</li> </ul>

**Symptom 4: The water pressure relief valve opens**

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The water volume in the installation is too high.	Make sure that the water volume in the installation is under the maximum allowed value (refer to "Checking the water volume and expansion vessel pre-pressure" on page 14).